Elizabeth City State University
Nurturing ECSU Research Talent (N.E.R.T.)
2002-2003 Annual Report

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N.E.R.T.

Nurturing ECSU Research Talent
Elizabeth City State University

This program, entitled "Nurturing ECSU Research Talent" focuses on undergraduate education and undergraduate research experiences. Nurturing these young researchers is a primary concern. Highest priority is given to providing them with the guidance and skills to insure their entrance and success in graduate school. Further, each student learns the fundamentals of scientific research, in a team setting, under the guidance of a faculty mentor. Program activities are as follows:

1. Student development activities

   a) Recruitment of high ability minority students;
   b) Providing a precollege/summer experience for recruited students;
   c) Providing research experiences;
   d) Providing a mentor, graduate school counseling and GRE preparation;
   e) Providing funds for student travel.
   f) Providing financial support for students in the form of research scholarships;

2. Infrastructure activities

   a) Enhancement of current computer graphics and operating systems courses;
   b) Development of a new course in computer visualization;
   c) Establishing a visiting lecture series in computer science;
   d) Providing UNIX network management support;
   e) Acquisition of computer equipment appropriate to support of research training.

Ninety-seven students have participated in the Nurturing ECSU Research Talent Program. Of those 97 students, 13 are current students, 23 did not complete the program, 61 graduated and 45 entered graduate school. The percent of graduates going on to graduate school is 74%. The program has provided student travel funds, support for faculty research, and over one million dollars in scholarships.

In addition to producing students who go on to graduate studies in mathematics and science, the ONR Nurturing ECSU Research Talent Program has made tremendous impact on the research capability and collaborations in Northeastern North Carolina. ONR NERT Funds have been leveraged with support from NOAA, NASA, NC Fisheries and other State resources to develop the Center of Excellence in Remote Sensing Education and Research (CERSER). CERSER provides support facilities and training resources for ECSU faculty and students who are involved in DoD, NASA and NOAA research and projects. Within the CERSER remote sensing laboratory, faculty and students work to develop innovative and relevant research collaborations focused on coastal, ocean, wetlands, and space research. Both the CERSER Remote Sensing Laboratory and the CERSER Research Vessel are used in support of both research and training activities. Some of the research and training project are listed below.

Research Project Title	Principal Investigators	Funding
Coastal Ocean Observations: AVHRR SST Data Correlated with the Presence of Sea Turtles	Dr. L. Hayden	ONR
Conservation and Biology of Protected Species Using Remote Sensing Capabilities at ECSU	Dr. L. Hayden and Dr. W. Porter	NOAA
The CoastWatch Data Validation Study	Dr. L. Hayden and Dr. C. Sun	NOAA
Undergraduate Research Experience in Ocean, Marine & Space Science	Dr. L. Hayden	ONR
You Be The Scientist With Satellite Imagery	Dr. L. Hayden	NASA
Mathematics of The Great Dismal Swamp	Dr. L. Hayden	NASA
A Geographic Study of Marine Life in the Local Waters in Northeast North Carolina	Dr. W. Porter	ONR
Crystal Growth in a Microgravity Environment	Dr. H. Banerjee	NASA
ARCVIEW/GIS Software as a Tool for Evaluating Coastal Populations	Dr. William Porter	ONR
Remote Sensing Classification and Time Change Analysis of the Wetlands of the Albemarle Sound	Dr. F. San Juan	NOAA
Water Quality and Biological Monitoring of Northern Albemarle Sound	Dr. K. M. Fischer	SeaGrant
Pasquotank Water Quality Project	Dr. M. Powers	Dept of Ed
Seasonal Changes in Phytoplankton Concentration in the Albemarle Sound Using the Sea WIFS Satellite Images	Dr. F. San Juan	NOAA
Network Resources and Training Site	Dr. L. Hayden	NASA
Center of Excellence in Remote Sensing Education and Research	Dr. L. Hayden	ONR/NASA

ONR Funding Information

N00014-94-1--1089
N00014-01-1-1070
N00014-11-0529
N00014-94-1--0948
N00014-99-1-0990
N00014-97-1--0650

1993 STATISTICS

1993	ALL ECSU STUDENTS				ONR STUDENTS				GRADUATES		ENTERING GRAD SCHOOL	
Major	FR	SO	JR	SR	FR	SO	JR	SR	ALL	ONR	ALL	ONR
CHEMISTRY	NA	5	7	4	NA	3	0	1	0	0	0	0
COMPUTER SCI	NA	48	30	18	NA	4	6	9*	15	3	3	2
MATHEMATICS	NA	9	19	11	NA	4	1	2	8	1	0	0
PHYSICS	NA	0	0	3	NA	0	0	0	0	0	0	0
TOTALS	NA	62	46	36	NA	11	7	12	23	4	3	2

1994 STATISTICS

1994	ALL ECSU STUDENTS				ONR STUDENTS				GRADUATES		ENTERING GRAD SCHOOL	
Major	FR	SO	JR	SR	FR	SO	JR	SR	ALL	ONR	ALL	ONR
CHEMISTRY	NA	8	3	9	NA	1	0	1	2	0	0	0
COMPUTER SCI	NA	51	20	3	NA	0	1	5	11	5	5	5
MATHEMATICS	NA	12	11	19	NA	0	1	4	6	0	1	0
PHYSICS	NA	6	0	6	NA	3	0	0	1	0	1	0
TOTALS	NA	77	34	37	NA	4	2	10	20	5	6	5

1995 STATISTICS

1995	ALL ECSU STUDENTS				ONR STUDENTS				GRADUATES		ENTERING GRAD SCHOOL	
Major	FR	SO	JR	SR	FR	SO	JR	SR	ALL	ONR	ALL	ONR
CHEMISTRY	4	3	9	6	0	0	0	0	3	0	2	0
COMPUTER SCI	42	28	21	31	5	1	6	5 *	22	7	4	4
MATHEMATICS	11	16	25	12	4	0	0	0	8	0	0	0
PHYSICS	0	0	7	0	0	0	2	0	0	0	0	0
TOTALS	57	47	62	49	9	1	8	5	33	7	6	4

1996 STATISTICS

1996	ALL ECSU STUDENTS				ONR STUDENTS				GRADUATES		ENTERING GRAD SCHOOL	
Major	FR	SO	JR	SR	FR	SO	JR	SR	ALL	ONR	ALL	ONR
CHEMISTRY	NA	5	3	3	NA	0	0	0	4	0	0	0
COMPUTER SCI	NA	39	29	25	NA	4	1	3	18	4	3	3
MATHEMATICS	NA	5	13	18	NA	1	2	2	13	1	1	1
PHYSICS	NA	1	0	1	NA	0	0	0	1	0	0	0
TOTALS	NA	50	45	47	NA	5	3	5	36	5	4	4

1997 STATISTICS

1997	ALL ECSU STUDENTS				ONR STUDENTS				GRADUATES		ENTERING GRAD SCHOOL	
Major	FR	SO	JR	SR	FR	SO	JR	SR	ALL	ONR	ALL	ONR
CHEMISTRY	3	3	6	4	0	0	0	0	4	2	2	0
COMPUTER SCI	63	30	39	29	5	2	3	5	29	4	4	4
MATHEMATICS	5	7	10	15	0	1	2	3	14	0	0	0
PHYSICS	1	1	1	3	0	0	1	0	1	0	0	0
TOTALS	72	41	56	51	5	3	6	8	48	6	6	4

1998 STATISTICS

1998	ALL ECSU STUDENTS				ONR STUDENTS				GRADUATES		ENTERING GRAD SCHOOL	
Major	FR	SO	JR	SR	FR	SO	JR	SR	ALL	ONR	ALL	ONR
CHEMISTRY	1	3	6	3	0	0	0	0	3	0	0	0
COMPUTER SCI	56	35	34	33	6	4	3	4	15	4	3	3
MATHEMATICS	7	5	7	11	0	0	1	2	6	1	1	1
PHYSICS	1	0	1	1	0	0	0	2	1	1	1	1
TOTALS	65	43	48	48	6	4	4	8	25	6	5	5

1999 STATISTICS

1999	ALL ECSU STUDENTS				ONR STUDENTS				GRADUATES		ENTERING GRAD SCHOOL	
Major	FR	SO	JR	SR	FR	SO	JR	SR	ALL	ONR	ALL	ONR
CHEMISTRY	0	2	2	7	0	0	0	0	4	0	1	0
COMPUTER SCI	66	47	28	39	6	4	4	5	12	5	5	5
MATHEMATICS	2	5	6	21	0	0	1	1	4	2	2	1
PHYSICS	3	0	0	0	1	0	0	0	0	0	0	0
TOTALS	71	54	36	67	7	4	5	6	20	7	8	6

2000 STATISTICS

2000	ALL ECSU STUDENTS				ONR STUDENTS				GRADUATES		ENTERING GRAD SCHOOL	
Major	FR	SO	JR	SR	FR	SO	JR	SR	ALL	ONR	ALL	ONR
CHEMISTRY	1	1	1	7	0	0	0	0	3	0	1	0
COMPUTER SCI	71	43	41	37	7	5	3	2	28	2	2	2
MATHEMATICS	7	3	2	11	3	0	0	1	7	1	3	1
PHYSICS	1	3	0	0	0	2	0	0	0	0	0	0
TOTALS	80	50	44	55	10	7	3	3	38	3	6	3

2001 STATISTICS

2001	ALL ECSU STUDENTS				ONR STUDENTS				GRADUATES		ENTERING GRAD SCHOOL	
Major	FR	SO	JR	SR	FR	SO	JR	SR	ALL	ONR	ALL	ONR
CHEMISTRY	3	1	2	3	0	0	0	0	3	0	0	0
COMPUTER SCI	34	50	41	25	2	4	3	2	23	2	2	2
MATHEMATICS	8	8	3	4	0	3	1	0	4	0	0	0
PHYSICS	1	1	2	0	1	1	3	0	0	0	0	0
TOTALS	45	60	48	32	4	8	7	2	32	2	2	2

NOTE:
Five ONR program students (all CS majors) delayed their entrance into graduate school by one year or more. They are not included in the annual statistics. Information on non-ONR students who delayed entrance into graduate school is not available.

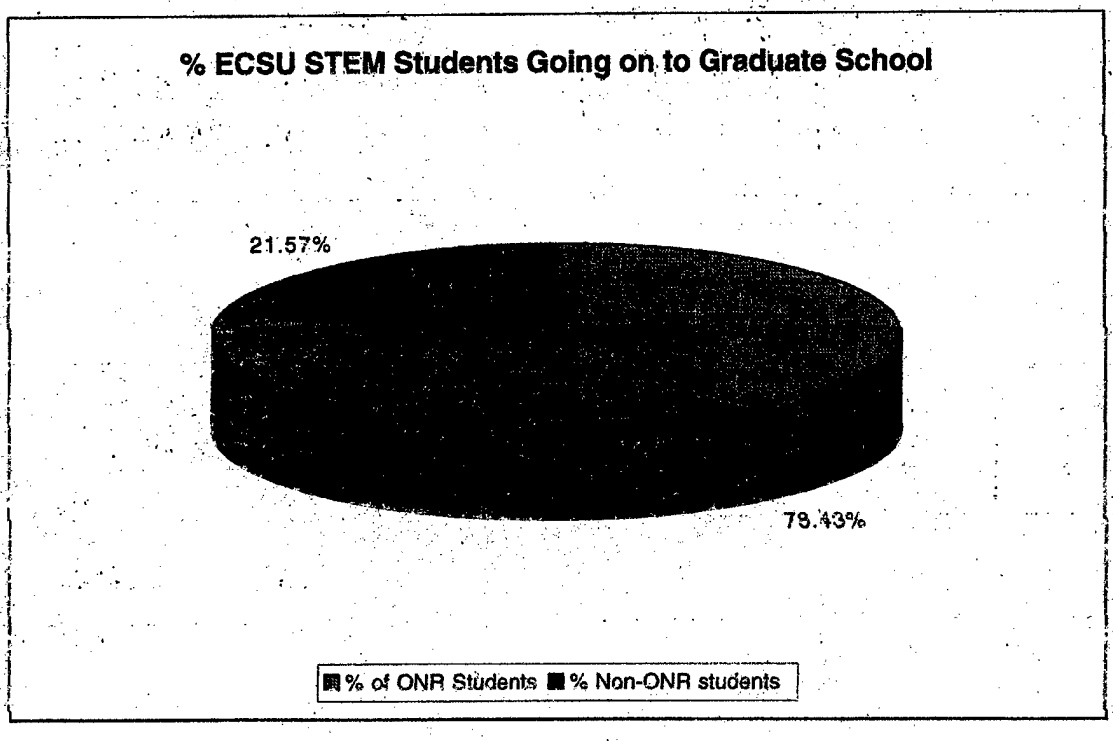
Total Number of ECSU STEM Students vs. ONR Students Going on to Graduate School

By Year	Number ECSU students Going On to Graduate School	Number of ONR Students Going On to Graduate School
1993-94	3	2
1994-95	6	5
1995-96	6	4
1996-97	4	4
1997-98	6	4
1998-99	5	5
1999-00	8	6
2000-01	6	3
2001-02	2	2
2002-03	5	5
Total # Students	51	40
Delayed Grad School Admits	unknown	5

% of ONR Students	% Non-ONR students
0.7843	0.2157

NOTE: ONR students made up 78.43% of the SMET students going on to graduate school from ECSU 1993-2003

Five ECSU Students delayed graduate school admission by at least one year. Data on delayed admission for non-ONR students is not available



ONR Nurturing ECSU Research Talent Program

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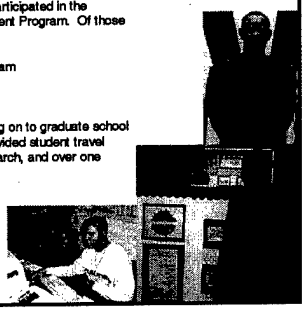
ONR/DoD HBCU/MI Infrastructure Program

Ninety-seven students have participated in the Nurturing ECSU Research Talent Program. Of those 97 students,
- 13 are current students
- 23 did not complete the program
- 61 graduated
- 45 entered graduate school

The percent of graduates going on to graduate school is 74%. The program has provided student travel funds, support for faculty research, and over one million dollars in scholarships.



NERTS
Nurturing ECSU Research Talent

ONR - Nurturing ECSU Research Talent Program focuses on increasing the number of minority students pursuing careers in science, mathematics or engineering through:

- **Undergraduate Research Experience**
- **Graduate School Preparation**
- **Contact with outside Scientist and Researchers**
- **Academic Year Research Training and Mentoring by Faculty Mentors**
- **Travel to Appropriate Undergraduate Research Forums**

NERTS
Nurturing ECSU Research Talent

The Office of Naval Research-Nurturing ECSU Research Talent program involves undergraduate SMET majors in academic year team research activities.

- **Meetings began in early September and are held every Tuesday and Thursday, 5-6 PM through Mid April.**
- **Meetings start with a 20-30 minute announcement period during which time students learn about internship opportunities, hear program announcements, give team reports, discuss travel logistics and goals of the program.**
- **Students then meet with faculty mentors or attend training on tools used for research.**
- **Students spend 20 hours/week in the undergraduate research computer laboratory completing task sheet requirements and research assignments.**
- **Visiting Lectures are scheduled several times each semester featuring scientists and researchers from government and industry.**
- **An Internship Roundtable is held each fall featuring reports on student summer research experiences.**
- **The closing program is held on two nights in early April.**
- **During the closing program, students make oral presentations of their research training activities.**
- **All research teams are also required to complete written reports and to maintain a team webpage.**

2002-2003 Academic Year Activities

- **Posters on the Hill**
- **Final Reports**
- **Expanding Opportunities Conference**
- **Dr. J. Earls, Excellence Without Excuses**
- **Black Creativity 2003**
- **FOCUS 2003 Atlanta, Georgia**
- **2002 Internship Round Table**
- **Visiting Lecture - Dr. William Mackey**
- **NRTS Awards Banquet**
- **SOARS 2002**
- **Summer 2002 Internships**
- **National Technical Association 2002**

2002-2003 Academic Year Research Teams

- **Globe**
  Environmental Data Collection
  http://nia.ecsu.edu/onr/02-03/research/globe/index.html
- **Multimedia**
  Construction of the CERSER.ECSU.EDU website
  http://nia.ecsu.edu/onr/02-03/research/multimedia/index.html
- **Networking**
  Implementing local and global site polices for the UMFORT and Cerser networks
  http://nia.ecsu.edu/onr/02-03/research/networking/homepage.html
- **Remote Sensing**
  Processing and Decryption of HRPT and SeaWifs Data
  http://nia.ecsu.edu/onr/02-03/research/rs/Remote%20Sensing/Abstract.htm
- **Unix**
  Software Tools For Signal Processing Support
  http://nia.ecsu.edu/onr/02-03/research/unix/frame_unix.html

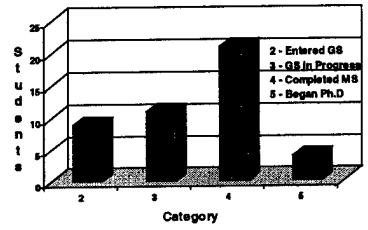
2001-2002 Academic Year Activities

- IGARSS 2002, Toronto
- 2001 Internship Roundtable
- URE-OMS 2002
- Sigma Xi
- Posters on the Hill
- NTA 2001
- TSU Research Symposium
- Final Reports
- Honors Convocation
- NC State Graduate Day
- SPCG Awards Banquet
- Focus 2002
- NRTS Awards
- Soars 2001
- Dr. Evans Webcast
- 2001 Summer Internships
- IGARSS 2001, Sydney, Australia
- NOAA Research Participation Program
- Visiting Lecture - Dr. D. Sengupta
- Visiting Lecture - Dr. Lawrence DeLucas
- Visiting Lecture - Dr. Megan Mahoney

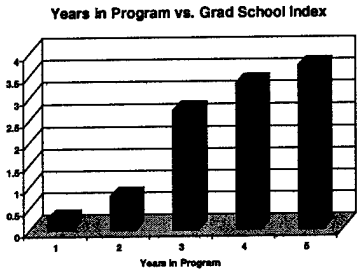
2001-2002 Academic Year Activities

- **Multimedia**
  Math of The Great Dismal Swamp: CD-Rom Production Project
  http://mmt.cs.ecsu.edu/mmt_2002/index.html
- **Networking**
  The Implementation of Point-to-point Infrared Local Area Network (LAN)
  http://nia.ecsu.edu/onr/01_02_school_year/networking/frontpage.htm
- **Physics**
  Investigations of An Interactive Textbook
  http://nia.ecsu.edu/onr/01_02_school_year/physics/physframe_02.html
- **Database**
  Extension of the Norfolk post-1947 database, to include data from the 1887-1947
  http://nia.ecsu.edu/onr/01_02_school_year/database/index.html

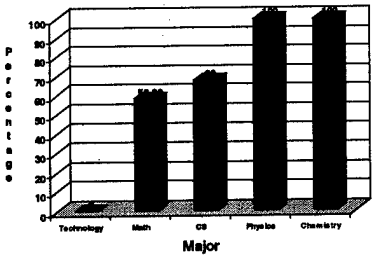
ONR Graduate Success Rate



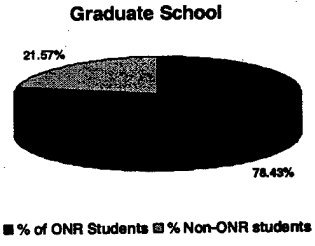
ONR Years in Program vs. Grad School Index



ONR Graduate School Attendance by Major



ONR STEM Students Going on to Graduate School



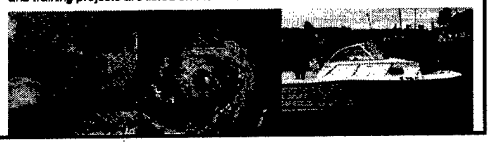
Graduate Schools Attended by ONR Alumni

- 1 Old Dominion University
- 1 American University
- 1 California State University
- 1 City University of New York
- 4 East Carolina University
- 1 Fayetteville State University
- 14 Hampton University
- 7 Howard University
- 2 John Hopkins University
- 8 North Carolina A & T State University
- 3 North Carolina State University
- 2 Norfolk State University
- 2 Old Dominion University
- 1 Ohio State University
- 1 University of Maryland - College Park

Total 49

ONR/DoD HBCU/MI Infrastructure Program

In addition to producing students who go on to graduate studies in mathematics and science, the ONR Nurturing ECSU Research Talent Program has made tremendous impact on the research capability and collaborations in Northeastern North Carolina. ONR NERT funds have been leveraged with support from NOAA, NASA, NC Fisheries and other state resources to develop the Center of Excellence in Remote Sensing Education and Research (CERSER). CERSER provides support facilities and training resources for ECSU faculty and students who are involved in DoD, NASA and NOAA research and projects. Within the CERSER remote sensing laboratory, faculty and students work to develop innovative and relevant research collaborations focused on coastal, ocean, and wetlands research. Both the CERSER Remote Sensing Laboratory and the CERSER Research Vessel are used in support of both research and training activities. Some of the research and training projects are listed on the next slide.



URE OMS

The objective of the Undergraduate Research Experience in Ocean and Marine Science (URE OMS) program is to promote the professional development for minority undergraduate students through their participation in ocean and marine science research.

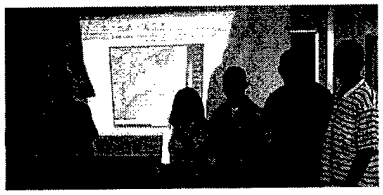
The program consists of at least ten undergraduate students. Each student is assigned to a specific research team, where he/she works closely with a scientist or faculty mentor. In addition, seminars, distinguished lectures, and social functions are organized to facilitate interaction. The project is conducted for eight weeks each summer, with on-line mentoring and follow-up during the academic year.

URE OMS 2003 Research Teams

- **Bottlenose Dolphin Occurrence and Activity on the VA/NC Coastline and its relation to Sea Surface Temperature**
  Mentor: Mr. Kevin Foss
- **Science, Settlement, and Remote Sensing; locating the Remains of the "Lost Colony"**
  Mentor: Dr. Dwayne Williams & Mr. Fred Willard
- **Correlation of CoastWatch AVHRR SST data with the Presence of Whales off the Eastern Coast**
  Mentors: Dr. Mohamed Mohamed & Dr. Kevin Chu
- **Microgravity Research**
  Mentor: Dr. H. Banerjee (sponsored by MU-SPIN Office of GSFC)
- **Fish Stock Assessment/NOAA/Jackson State University**
  Mentor: Dr. Paulinus Chigbu (sponsored by NOAA and ONR)

URE OMS 2001

- **Coast Watch Validation Study Team 2001**

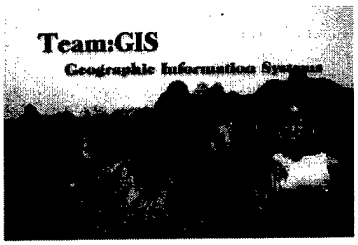


URE OMS 2001

- **Validation of LITE Troposphere and Stratospheric Measurements**

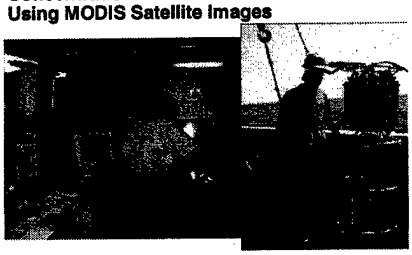
URE OMS 2001

- Arcview/GIS Software As A Tool for Evaluating Coastal Population



URE OMS 2002

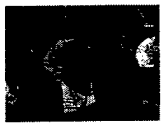
- Seasonal Changes in Phytoplankton Concentration in the North Eastern Atlantic Using MODIS Satellite Images

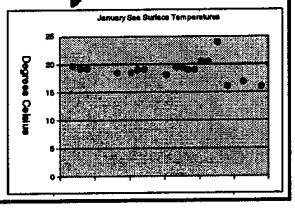


URE OMS 2002

- Correlation of AVHRR SST with the Presence of Loggerhead Turtles

MONTH	SST
January	17.1-23.4
April	19.2-21.6
July	28.1-29.7
August	28.7-30.1
September	28.4-29.6





URE OMS 2002

- Multi-Formula Modeling Utilizing the Ricker, Schaefer, and Von Bertalanffy Formulae

URE OMSS 2003

- Bottlenose Dolphin Occurrence and Activity on the VA/NC Coastline and its relation to Sea Surface Temperature

URE OMS 2003

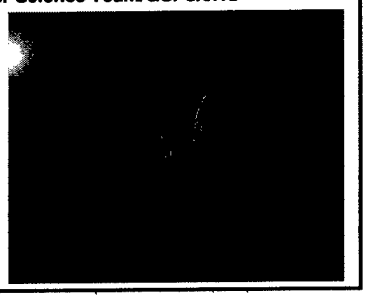
- Science, Settlement, and Remote Sensing; locating the Remains of the "Lost Colony"

URE OMS 2003

- **Correlation of CoastWatch AVHRR SST data with the Presence of Whales off the Eastern Coast**

URE OMS 2003

- **Messenger Science Team/GSFC/JHU**



Naval Research Laboratory Internships

- **NRL Virtual Reality Laboratory**

Three Dimensional Models From 2-D Images
Researcher: Golar Newby (summer 2000)
Mentor: Edward Swan II, ONR NRL

Three - Dimensional Battlefield Simulation of Realtime Kosovo
Researcher: Donald Charity (summer 1998)
Mentor: Dr. Rob King, ONR-NRL

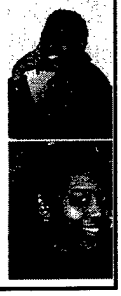
VRML 2.0 - Virtual Modeling Language Version 2.0 Development and Interactivity
Researcher: Donald Charity (summer 1999)
Mentor: Dr. Edward Swan II, ONR-NRL

Note: Donald Charity completed his masters degree in CS in May of 2003. He is now working at the NRL-VR lab. Donald is scheduled to begin his Ph.D studies at Howard University in the Fall of 2003

Naval Research Laboratory Internships

Digital Terrain Elevation Data (DTED)
Researcher: Stacia McFadden (summer 1996)
Mentor: Dr. Lawrence Rosenblum, ONR-NRL

Bambo: A Portable System for Dynamically Extensible, Real-time, Networked, Virtual Environments
Researcher: Alicia Jones (summer 1998)
Mentor: Dr. Simon Julier, ONR-NRL



Naval Research Laboratory Internships

- **NRL Virtual Reality Laboratory**

Virtual Reality Laboratories Web Site
Researcher: Melvin Mattocks (summer 1999)
Mentor: Paul Massel, ONR-NRL

VRML and *.wrl Class Files
Researcher: Je'aime Powell (summer 2000)
Mentor: Simon Julier, ONR Naval Research Lab

Flock of Birds Motion Tracking System
Researcher: Charles Gatling (summer1997)
Mentor: Dr. Lawrence Rosenblum, ONR-NRL

ONR/DoD HBCU/MI Infrastructure Program

Research Project Title	Principal Investigators	Funding
Coastal Ocean Observations: AVHRR SST Data Correlated with the Presence of Sea Turtles	Dr. L. Hayden	ONR
Conservation and Biology of Protected Species Using Remote Sensing Capabilities at ECSU	Dr. L. Hayden and Dr. W. Porter	NOAA
The CoastWatch Data Validation Study	Dr. L. Hayden and Dr. C. Sun	NOAA
Undergraduate Research Experience in Ocean, Marine & Space Science	Dr. L. Hayden	ONR
You Be The Scientist With Satellite Imagery	Dr. L. Hayden	NASA
Mathematics of The Great Dismal Swamp	Dr. L. Hayden	NASA
A Geographic Study of Marine Life in the Local Waters in Northeast North Carolina	Dr. W. Porter	ONR
Crystal Growth in a Microgravity Environment	Dr. H. Banerjee	NASA
ARCVIEW/GIS Software as a Tool for Evaluating Coastal Populations	Dr. William Porter	ONR
Remote Sensing Classification and Time Change Analysis of the Wetlands of the Albemarle Sound	Dr. F. San Juan	NOAA
Water Quality and Biological Monitoring of Northern Albemarle Sound	Dr. K. M. Fischer	SeaGrant
Pasquotank Water Quality Project	Dr. M. Pavero	Dept of Ed
Seasonal Changes in Phytoplankton Concentration in the Albemarle Sound Using Sea WIFS Satellite Images	Dr. F. San Juan	NOAA
Network Resources and Training Site	Dr. L. Hayden	NASA
Center of Excellence in Remote Sensing Education and Research	Dr. L. Hayden	ONR/NASA

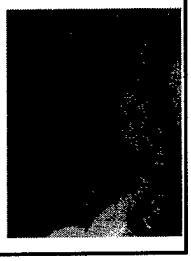
CERSER

Center of Excellence in Remote Sensing Education and Research

Goal/Purpose

It is the intent of this project to develop an innovative and relevant research collaboration focused on coastal, ocean, and marine research. This project represents a joint effort by:

- The Office of Naval Research (ONR)
- Elizabeth City State University (ECSU)
- The Center of Excellent in Remote Sensing Education and Research (CERSER)
- The MU-SPIN Office of Goddard Space Flight Center (GSFC)
- The National Oceanic and Atmospheric Administration (NOAA)
- Pbroneer Corporation
- SeaSpace, Inc.
- NOAA's Wakefield Office of the National Weather Service (NWS)



CERSER

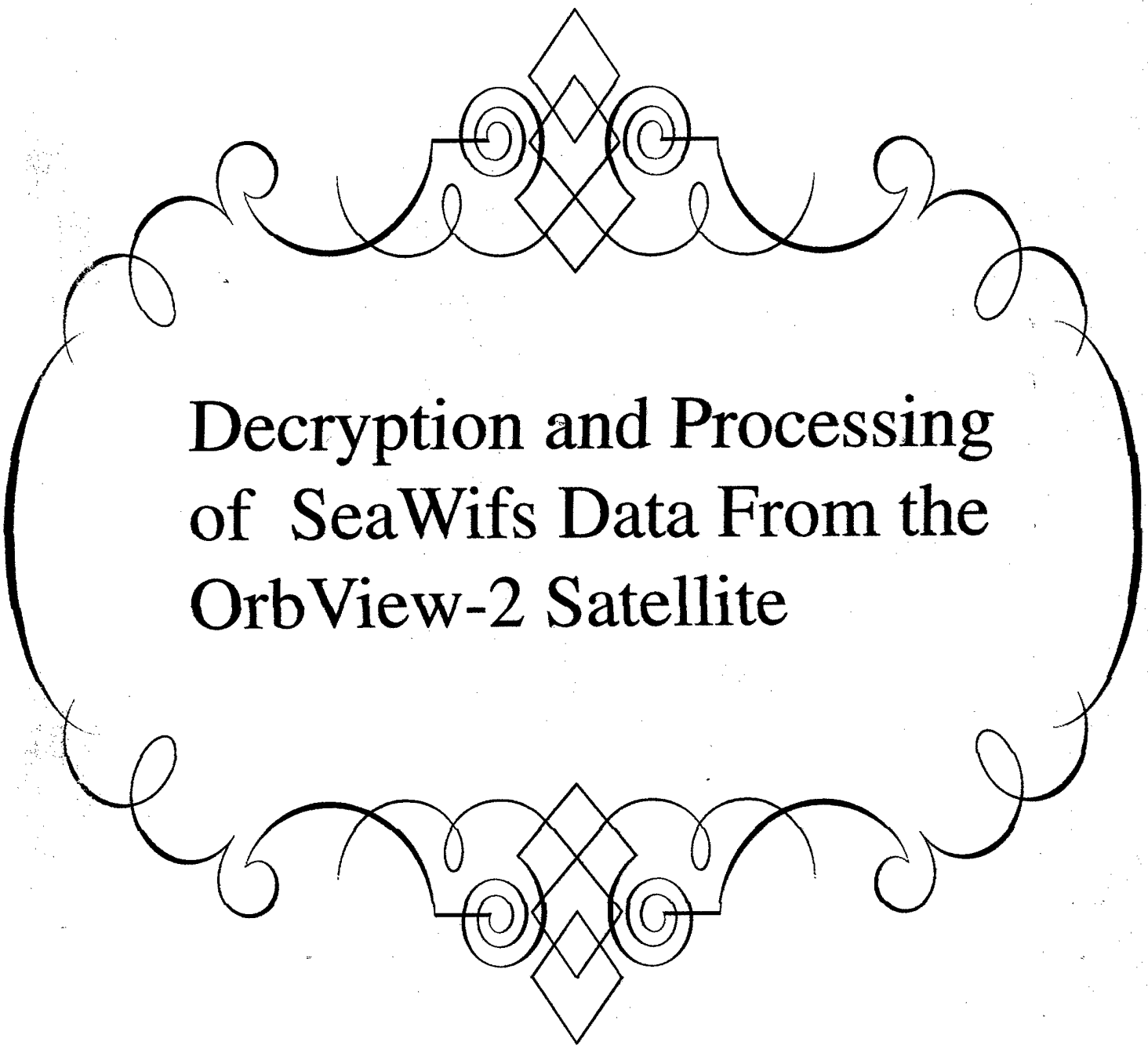
Center of Excellence in Remote Sensing Education and Research

The CERSER Lab consists of the following:

- TeraScan HRPT system System is composed of the following components:
- Polar Orbiting Tracking 1.5m Antenna
- Global Positioning System (GPS) Antenna/Receiver
- Telemetry Receiver
- Workstation
- Uninterruptible Power Supply (UPS)
- TeraScan Software Suite
- Laboratory consisting of 15 Computer Workstations containing Linux, Windows 2000, and Windows XP
- Remote Storage Areas of Research Information
- Servers including a local Web Server, File Server, and an Online Course Server

For More Information on the
ONR Nurturing ECSU Research Talent Program:

http://nia.ecsu.edu/onr/onr.html



Decryption and Processing of SeaWifs Data From the OrbView-2 Satellite

Satellite Imagery
April 8, 2003

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Team Page
http://www.nia.ecsu.edu

Abstract

The remote sensing field has seen an increase in the availability of data. There has been an increase in the satellites that have been launched and those scheduled to launch. With the increased availability of data and advancements, satellites data providers are able to supply researches with the data needed to conduct new and innovative projects.

Sea Space, based in California, has designed TeraScan, a system for reception and processing of satellite data. During July 2002 a TeraScan system was installed on the campus of Elizabeth City State University. Its capabilities include receiving and processing HRPT and SWCRPT data from polar-orbiting satellites NOAA and Orbview-2.

The Remote Sensing Research Team for 2003 learned how to process HRPT data from the NOAA satellites and decrypt and process SeaWiFS data from the Orbview-2 satellite. The team also learned how to process the data for sea surface temperature. This project will lay the foundation for future projects by providing the necessary experience and training with the TeraScan data and software.

Review of Literature

Sea Surface Temperature Observations from Satellite-Training Module 8
http://henry.pha.jhu.edu/ssip/asat_int/ocean.html

By using satellites to observe the oceans we can study the characteristic of the oceans, and we can also look at large areas of the ocean so they can be studied and monitored at a better time scale. SST is a very useful data set that is in relation to remote sensing. SST can be used in many ways to help scientist observe ocean circulation and locate major ocean currents. SST can also help scientists observe changes in ocean temperatures, detections of the formation of sea ice, and lastly it can be used to help locate living resources that are associated with specific thermal features in the oceans (1).

Oceans are important because they take part in the heat exchange system. Oceans that are located near the equator absorb heat from the sun, which makes the warm ocean currents flow to the poles. This is called ocean circulation and it is driven by the wind. In the Northern Hemisphere the flow of the current is clockwise, while in the Southern Hemisphere the flow is counterclockwise. These circulation patterns are known as gyres (1).

The article goes on to talk about oceanfronts, which are boundaries between water masses of a different density. There are two types of fronts: thermal (temperature) fronts and haline (salinity) fronts. Both of these fronts exist in the ocean. The differences between these two are that the thermal front is a zone with a horizontal temperature gradient, while a haline front has a horizontal salinity gradient. Oceanfronts can spread over large volumes of ocean water. Using satellites, you can detect ocean thermal fronts in the

surface layers of the ocean. Because of the difference in temperature image enhancement techniques are used to highlight the ranges of temperature of the ocean surface.

With satellite images, everything you see is not true because satellites are five hundred miles up into space and they move at speeds of 20,000 mph. The image may not be exactly in the right spot because of the speed of satellites. In order for one to know if the image is correct, one must first look at the image very carefully. Sometimes the alignment of the lines may be wrong, but as mentioned earlier, if one looks closely at the image coastlines, clouds, ocean, or land may come into view.

Deep red area in the images represent hot temperatures and the land area, the clouds are usually bluish-purple, and the oceans tend to be green and yellow. The colors may change for other sea surface temperature images. Because the satellites are so high up in space they cannot see through the clouds, but they see the temperature of the cloud and not the earth below it. Clouds are so high into the sky that their temperature is cooler than the earth that is beneath them (10). So by knowing this one can look at images and see the areas where the clouds are located.

Remote Sensing for Public Health-" *Surveillance and Response"*

This article by Nancy G. Maynard discusses the rise of environment-related public health problems over recent years and the steps that are being taken to better monitor areas where these problems begin and where they reside. Remote sensing is now playing a major part in the monitoring of these problems. A few examples include how the use of near-real-time climate data and satellite imagery will assist NASA scientists to better track climate patterns associated with these disease outbreaks. This technology is currently being used to monitor Rift Valley fever in Africa (8). In Baltimore, scientists are using remote sensing technology to study the rapidly increasing cases of asthma in Baltimore, MD. The data is integrated using what is known as geographic information systems of GIS to determine possible relationships to the occurrence of asthma.

Most remotely sensed data used in public health studies has been acquired by such passive remote sensing systems NASA's Land stat Multispectral Scanner (MSS), Thematic Mapper ™, and NOAA's Advanced Very High Resolution Radiometer (AVHRR). Remote sensing is used to study other environmental factors important to health issues such as air and water quality, thermal extreme, ultraviolet radiation, and oceanic harmful algal blooms (8).

A Change in the Weather- *"How NASA is Leading a Revolution in Weather Measurements"*

This article written by Stephen P. Sanford and William L. Smith discusses the effects that weather has on almost every aspect of our lives. It first explained the importance of being able to accurately predict day- to-day weather conditions and patterns to enable us to adjust our daily activities accordingly (9). Weather affects all types of business from commercial transportation to power plants and this article explains why.

The article then tells the reader about the properties of weather. The study of weather, known as meteorology, involves the study of the relationship between atmospheric temperature, pressure and humidity. It discusses the various devices used to study these properties such as ground stations, radars, balloons, and national satellite systems, both in low Earth orbit and geostationary orbit around 36,000 kilometers above Earth. Funding for these come from various organizations such as the National Oceanic and Atmospheric Administration or NOAA and of course NASA (9).

The New Millennium Program or NMP is a recent NASA program that is designed to prove new component and system technologies. The primary instrument to be used is known as GIFTS or Geostationary Imaging Fourier Transform Spectrometer. This technology will provide unprecedented accuracy in the study of weather. However this technology is not projected to be fully operational until 2012.

Introduction

This TerraScan 3.0 system was a system designed by Sea Space for the reception and processing of HRPT and SWCRPT data provided by the use of NOAA and Orbview-2 satellites. It is an integrated system of hardware and software that can also receive automated data from meteorological and environmental satellites for displaying and manipulating data, archiving and process of data, creating or modifying images, or dispersing products according to user specifications (11).

The 2002-2003 satellite imagery research team processed HRPT and SeaWiFS data and also learned how to copy files from a file server to a local machine using a LINIX computer, and how to create a new shelf and how to add data to that shelf so that we could look at the images that we processed.

HRPT and SeaWiFS are the two types of data that we processed and decrypted during our research using the TeraScan system. High Resolution Picture Transmission is recognized as HRPT and is a system that receives data from different satellites and spacecraft instrument. It also produces different images resolution from different digital signals (7). This signal allows satellites to transmit different signals in special receiver to be decoded, to produce images. National Oceanic and Atmospheric Administration (NOAA and Sea Star) digital signal are usually producing about 1.7GHz at a resolution of 1.1 km per pixel (6). The 1.1 km resolution provides different spectral through visible bands and infrared bands. These bands can include about two visible bands and three infrared, which can be mixed together to provide color to images for detail. To be successful in receiving images through HRPT you are required to have the proper equipment. A satellite dish is needed so that you can receive data from images in space, a HRPT Receiver, and Universal Serial Bus Port. The satellite dish is connected to the preamplifier that is used to feed power to the cable from the receiver. The computer channel section from the satellites controls this receiver. Then the data is transmitted the images from the satellite using the Universal Serial Bus (USB) port will show (6).

The other data type is SeaWiFS and it is a color-sensitive optical sensor used to observe color variations in the Earth's oceans. SeaWiFS is used to provide uninterrupted data on the bio-optical properties of the oceans (2). The SeaWiFS project is NASA's first group effort to obtain both scientific and commercial data from the same satellite. SeaWiFS' is mainly used for the sensing of color variations in the Earth's oceans. The color variations are display phytoplankton, reminding sediments, and the presence of dissolved organic material. Phytoplankton is single-celled ocean plants that contain chlorophyll for photosynthesis (Sea-viewing Wide Field of view Sensor) (4). Chlorophyll stands out from the blue ocean water, as a result SeaWiFS can observe the phytoplankton concentrations of the ocean. SeaWiFS are essential to scientist when determining contributions of phytoplankton to aid the reduction of, showing pollutants, harmful bacteria. Commercial fishermen use the results to help locate large populations of fish

SST or sea surface temperature is the last method or procedure that we researched on how it is calculated. We used a function called nitpix, which uses a lookup table in TeraScan for each of the satellites (11). Several lookup methods can be used, but the most commonly used method is what we used and it is called the multi-channel method.

The procedures and methods on how to calculate SST as well as creating data shelves to process the HRPT and SeaWiFS images will be further discussed.

Procedures

Below are the following procedures used to process the HRPT and SEAWIFS data:

How to copy files from file server to local machine

In this step it will allow you to copy files from the server to local machine. This will also allow you to obtain images from the main server.

1. **Log on as xtuser**
2. **Open 2 file managers**
3. **In one file manager go to directory /usr2/DATA/whole_pass/hrpt.**
4. **In the second file manager go to /seaspace**
5. **Select file you want from the file server, copy it and paste to the file manager in step #3.**

Creating a New Shelf

1. Open TeraVision
2. Select **Open Data Shelf** from the **File** menu.

   The **Data Library** dialog box will appear.
3. Click on the **Edit Data Library** button.
   The **Data Library Editor** dialog box will appear. See **Notes** for an illustration of this dialog box and a description of some of its controls.
4. Click on the **Private** button (if not already selected), and then click on **New** on the left side of the dialog box to create a new private shelf, available only to the current user.

   The **Choose Shelf Location** dialog box will appear.
5. In the **Directory** text field, type **/usr2/DATA/whole_pass/hrpt**. Then press the return key. (See the **NOTES** for an alternate method for specifying the shelf path.)
6. Click on the **Accept** button.

   The **Shelf Name** prompt box will appear, prompting you to type a name for the new shelf.
7. In the text field of the prompt box, type ***"shelf name"*** for the shelf you are creating.

   You can use the letters, numbers, and spaces, as well as hyphens and dashes for a shelf name.
8. Click on the **Accept** button to add the new shelf to the library.

   The dialog box will close and you will be returned to the **Data Library Editor.**

   The name of the new shelf will be included in the **Shelves** list.
9. Continue with this exercise to add data types to the new shelf.

Adding a Data Type to the Shelf

In this portion of the task, you will organize the data on the new shelf into data types. This will allow you to add images to the data, in addition to customizing your data shelf to focus on certain images.

1. In the **Data Library Editor**, select the shelf for which you want to create data types (if it is not already selected) and then click on **New** on the right side of the dialog box.

2. **To name the data type:** Type **avhrr** in the **Data Type Name** text field on the left side of the dialog box.

3. In the **Comment** text field, enter an optional description for the data type that will be displayed in the **Data Library** dialog box when you select a data type.

4. **To select the datasets to be included in the data type:** Leave the **Files** text field as is.

   The * is a special wildcard character. It matches 0 or more characters. An asterisk with no other characters will display all datasets in the directory pointed to by the shelf.

5. **To display all the variables for the selected datasets:** Click on **Show All.**

6. Click on **Accept** to add this data type to the shelf and return to the **Data Library Editor.**

   The **avhrr** data type will be listed in the **Data Library Editor** dialog box.

   You can now add more data types if you want.

7. When you are done adding data types, click on the **Done** button of the **Data Library Editor.**

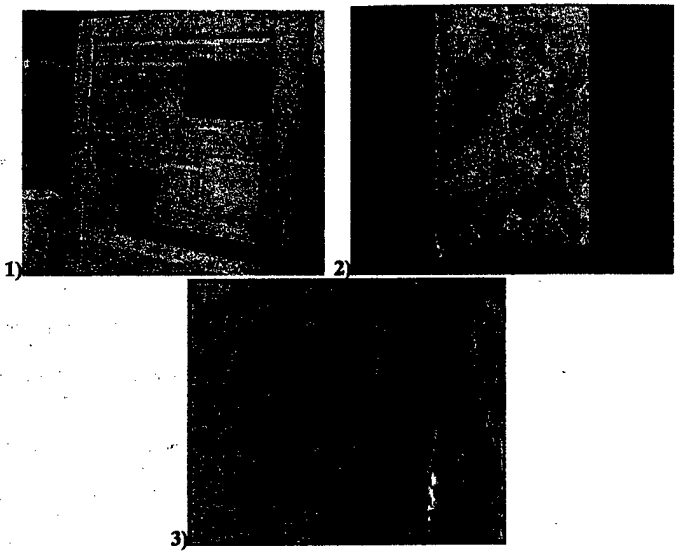
   This dialog box will close and you will return to the **Data Library** dialog box.

8. Select your shelf you just created from the **Library Shelf** options drawer.

9. Select one or more datasets from the **avhrr** data type to load them in to the TeraVision window.

10. Look at the image(s).

Picture 1 is an example of the TeraVision procedure. Image 2 is a raw image in a data shelf. Image 3 is an example of an image with contour lines in data shelf.



RETREIVING/DECRYPTING SEAWIFS

Seawifs data is a broadcast as swcrpt, which is the encrypted version of seawifs. ECSU has an authorized delayed-mode seawifs license which can decrypt the data two weeks or more after the data is required. Below are the following steps for retrieving the seawifs data from tape and processing hem into a whole pass image.

1. Use TeraCapCon to look at cataloged data. Find the pass number and the tape label for the pass that you are interested in decrypting.

2. Look at the satellite schedule and make sure that you won't be using the tape drive right after one of these passes finishes. If you are using the drive when the system tries to automatically archive, you will experience problems.

3. Eject the tape currently in the drive by pressing the eject button on the drive. Never push the eject button when the light on the drive is flashing. Then put the tape with the data that you are interested in into the tape drive.

4. [xtuser@Elizabeth xtuser2]$ archive
   operation : char(9) ? rewind
   dev_name : char(255) ? [/dev/st0]

5. [xtuser@Elizabeth xtuser2]$ archive
   operation : char(9) ? list
   dev_name : char(255) ? [/dev/st0]
   printout : char(3) ? [no]
   catalog_pass : char(3) ? [no]
   pass satel telem date time orbit scans label
   1 noaa-16 hrpt 2002/07/16 19:00:45 0 4464 TEST_001
   2 noaa-15 hrpt 2002/07/15 13:06:14 0 4149 TEST_001
   3 orbview-2 swcrpt 2002/07/16 18:30:05 0 3006 TEST_001
   4 noaa-12 hrpt 2002/07/16 20:47:55 0 4198 TEST_001

6. [xtuser@Elizabeth xtuser2]$ archive
   operation : char(9) ? rewind
   dev_name : char(255) ? [/dev/st0]

7. [xtuser@Elizabeth xtuser2]$ archive
   operation : char(9) ? posit
   dev_name : char(255) ? [/dev/st0]
   position :int ? [1] 3
   pass satel telem date time orbit scans label
   3 orbview-2 swcrpt 2002/07/16 18:30:05 0 3006 TEST_001

8. [xtuser@Elizabeth xtuser2]$ archive
   operation : char(9) ? restore
   dev_name : char(255) ? [/dev/st0]
   pass_number :int ? 15 (NOTE: This is the pass on the passdisk that you will write to.)
   (NOTE: Collect all data before going to step 9. Make sure you rewind tape each time. Rewind and swap tape before proceeding to step 9.

9. [xtuser @Elizabth ogp]$ ogpdecrypt /usr2/raw/PASS15 /usr2/raw/PASS15
   (NOTE: PASS## uses the ## from step 8.)

10. [xtuser@Elizabeth ogp]$ cd /usr2/xtuser2/seawifs
    (NOTE : This is the directory that you will put the processed image into.)

11. [xtuser@Elizabth xtuser2]$ seawifsin
    output file(s) : char(255) ? [.]
    format : char(7) ? [swhrpt]
    on_pass_disk : char(3) ? [yes]
    pass_number : int (16) ? [2] 15 (NOTE :Same pass# as from step8.)
    channels : int (8) ? [1 2 3 4 5 6 7 8]
    fix_missing : char(3) ? [yes]
    calibrate : char(3) ? [yes]
    byte_output : char(3) ? [no]
    delta_line : int ? [1]
    delta_sample : int ? [1]
    use_master : char(3) ? [yes] no
    start_time : char(15) ? [00:00:00]
    num_lines : int ? [6000]
    start_sample : int ? [1]
    num_samples : int ? [1285]
    Initials sensor tilt found to be +20 (AFT), satellite pitch set to -20.
    pass participation 15: orbview-2 2002/02/16 18:30: 05.498
    ./o2.02197.1830: Creating ...
    ./o2.02197.1830: Missing lines 4- 6
    ./o2.02197.1830: Missing lines 21- 21
    ./o2.02197.1830: Missing lines 41- 41
    ./o2.02197.1830: Missing lines 58- 58
    ./o2.02197.1830: Missing lines 2915 - 2918
    ./o2.02197.1830: Missing lines 2923 – 3014
    Sensor tilt value changed from AFT to MOVING at line 3039.
    ./o2.02197.1830: Missing lines3040 - 3139
    Sensor tilt value changed MOVING to AFT at line 3040.
    ./o2.02197.1830: Actual size is 3141 lines by 1285 samples
    (NOTE: Write down file name.)
12. Move decrypted pass from current location to: /usr2/DATA/whole_pass/swhrpt
    (NOTE: This is how to pull up files in Tera Vision)
    (NOTE: See step # 10 file can be decrypted in: /usr2/xtuser2/seawifs or /usr2/DATA/whole_pass/swhrpt)

Processing HRPT data requires a stable operating system, as a result UNIX is primarily used to process HRPT make the data available for users. The user must first choose the images that are going to be process, so they are copied to a folder on the local machines hard drive Within Linux, open a console to process a particular image followed by the command relating to the type output image. As a team we have work exclusively with sea surface temperature (SST). The function "nitpix" is used to convert the image to .sst picture to be manipulated in TeraVision afterwards (11). Below is an example of how the function will be expressed.

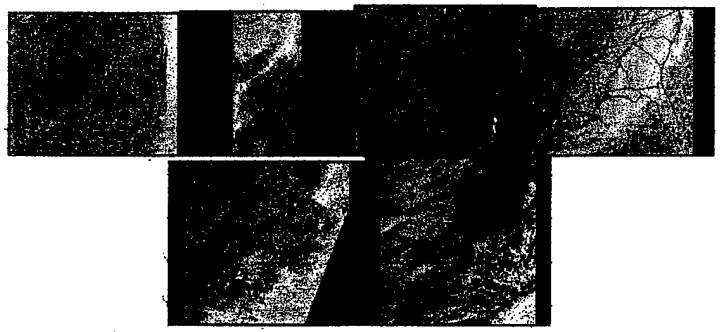
Nitpix
In/out files : char (255) ? TeraScan-image.avhrr TeraScan-image.sst
Sst_method : char (2) ? [mc]
Cos_sat_zen : real ? [0.6]
Ch4_delta : real ? [0.3] **1**
Ch2_max : real ? [3] **5**
Ch2_delta : real ? [3] **1**
Ch3_minus_ch4 : real ? [0.25]
Base_temp : real ? [0] **10**
Temp_step : real ? [0.1]
Min_ch4_temp : real ? [0]
Min_sun_reflect : real ? [0]
Nitpix.coef : Looking for coefficients for mc noaa-14 day

Nitpix.coef: mc noaa-14 D 1.321321 2.242342 0.983729 0.000000 -0.093482

Characters that are in bold are required to enhance the image. TeraVision can be run when the command launch pad is typed in the same console. In the data shelf editor select from which you want to create a data type, then click "new" on the right side of the dialog box. The application will ask for a name that will be used to represent the data type. In the data library editor select the data type, by clicking accept the data set will be added. Upon completion when done is clicked you will return to the data library editor and select the correct image. The image appears on the screen to be analyzed. Below is a sea surface temperature image:

Photo Appendix

Below is a HRPT image that were processed from NOAA satellites:



Conclusions

The TeraScan 3.0 system helped the Satellite Imagery team to copy the files needed to create data shelves so that HRPT and SeaWiFS data could be processed successfully. This allowed us to look at the raw images that were processed or received by the TeraScan system and manipulate them so that we could clearly view the images and be able to point out North Eastern North Carolina and the Hampton Roads area's boundaries. We also gained a lot of knowledge on how to use the LINIX machine so that our images could be brought up for viewing.

Future Research

The Remote Sensing team will follow up our research with an extensive look at NDVI. Normalized Difference Vegetation Index is used to show fluctuation patterns and vegetation degradation. This data is essential to farmers because the images reveal plant growth within a given area.

Acknowledgements

We would like to give our sincerest thanks to out mentor Mrs. Sharon Brown and her assistant Ms. Keisha Harris and also the principal investigator Dr. Linda Hayden.

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WORK HISTORY

2002-present **Project Manager, ADNET Systems, INC, Elizabeth City, NC**
Leading technical and training projects that involve the successful management of team composed of IT professionals and students. Assist in directing administrative activities, such as manpower and resource planning. Performs complex evaluations of existing procedure, techniques, models, and/or systems related to management problems that require a report and recommended solutions. Provides daily supervision and direction to staff.

1998-2002 **Sr. Information Security Analyst, Total System Services, Inc, Columbus, GA**
Develop, train and manage a Designated Security Officer's Program and security awareness program for the company. Provide on-call security support for TSYS tandem authorization systems and mainframe systems. Provide technical support on all Information Security Department's security programs and processes. Develop and maintain several audit reviews for TSYS. Analyze business and/or technical requirements to formulate a project plan. Perform analyses and issue resolutions of business and project requirements.

1997-1998 **Graduate Teaching Assistant/Trainer, Elizabeth City State University, Elizabeth City, NC**
Assist in teaching the following courses: Introduction to Computers, Data Structures, Artificial Intelligence, Computer Communications, and Operating Systems. Trained individuals how to use the computer and the Internet, and on different types of computer software such as Microsoft Office and Aldus PageMaker.

1995-1997 **Graduate Teaching Assistant, Hampton University, Hampton, VA**
Assist with grading computer programs and running a two-hour lab for Computer Science I Programming Classes. Also taught Introduction to Computers.

1992-1995 **System Network Administrator, ONR/NSA Computer Lab, Elizabeth City State University**
Duties include networking and maintaining the Sun Sparc Network of computers, installing software, installing user accounts and maintaining the integrity of the file system. Upgrading the operating system when necessary and doing weekly system backups.

EDUCATION

1995- present **Hampton University, Hampton, Virginia**
Masters of Science in Computer Science, GPA 3.567
Expected Graduation Date: Thesis pending

1991-1995 **Elizabeth City State University, Elizabeth City, North Carolina**
Bachelor of Science Degree in Computer Science, May 1995, GPA 3.367

COMPUTER SKILLS

- Computer applications include: Microsoft Office, Corel WordPerfect, HyperCard, Aldus PageMaker, Microsoft Works, Rapport, Framemaker, Authorware, Adobe PhotoDeluxe, Oracle
- Computer systems/hardware include: Unix, NT, System 7, Macintosh (all models), NeXt, Sun Sparc

Membership, Honors and Awards

- Member of IEEE Society
- Company Power of One award for Total System Services, Inc
- Cum Laude Graduate from Elizabeth City State University

4029 Cedar Lane Apt. A
Portsmouth, VA 23703
(757) 484-8582
kgwilliams@mail.ecsu.edu

Karitsa Williams

Objective

To obtain all the necessary skills to pursue degrees leading to a master's degree in the area of computer science.

Experience

September 2002- Present ECSU Elizabeth City, N. C.

- Member of the Remote Sensing team.
- Worked on research projects dealing with sea surface temperature.
- Analyzed weather patterns for the summer of 2002 using the TeraScan 3.0 system.

Education

2002-Present Elizabeth City State University;Elizabeth City, N. C

- Majoring in Computer Science with a concentration in Applied Mathematics.
- Enrolled in NASA/ONR NERT program.

1998-2002 I. C. Norcom High School Portsmouth, VA

- Enrolled in Magnet program.
- Graduated with honors and Cum Laude.

Technical Skills

HARDWARE: Gateway PC and Machintosh PC.
SOFTWARE: Microsoft Word, Excel, Power Point, Access, C++, Internet Explorer, TI-83 Plus calculator.

Honors & Awards

- MEAMPS Summer Bridges Program Completion- June 2002
- Honor Roll- Fall 2002
- Office of the Naval Research Scholarship Award

Conferences

-12th Annual SOARS Conference- Raleigh, N.C;Nov. 8, 2002
-Fourth Expanding Opportunities Conference-Tallahassee, FL (FAMU)
-Student Presenter

Memberships

Secretary- Freshman Class 2002-2003
ONR Research Student
MEAMPS
Lady Viking Tennis Team

REFERENCES AVAILABLE UPON REQUEST

BROWN, WILLIE L.

P.O. Box 252; 301 North
Garysburg, NC 27831
Home: (252) 536-4386
School Phone: (252) 331-7135

OBJECTIVE: It is my goal to obtain enormous experience in the field of computer science.

EDUCATION:

2002-present Elizabeth City State University Elizabeth, NC

- Major: Computer Science
- Concentration: Airway Science
- NASA Program

2001-2002 Southeast Halifax Scotland, NC

- High School Diploma
- Graduated with Honors
- Beta Club
- Member of the Senior Beta club
- Graduated in the top 25

1998-2001 Northampton County High School Gaston, NC

EMPLOYMENT:

1996-present Roanoke Chapel Baptist Church Jackson, NC

- Minister of Music
- Outreach Program

Summer of 2002 Project Uplift Jackson, NC

- Tutor English Studies(Roanoke Chapel Baptist Church)
- Tutor Mathematical Techniques
- Academic Tutor

INTERESTS: Playing Musical Instruments, Composing music, Arranging Music, Web Page Designing, Tutoring Academically Challenged Students, Community Service Projects

REFERENCES:

Available upon request

Anthony Anderson
1042 Davis Road
Elizabeth City, NC 27909

Goal:

As a computer science major, my goals and expectations very high. Everyday I strive to learn everything possible about computers; as a result I will be attending graduate school after college while applying for internships during the summer.

Education:

- 1998-2000 Northeastern High School
- 2000-2002 Pasquotank County High School
- High School Diploma

Courses:

- Keyboarding
- Computer Application
- Business and Electronics
- Computer Engineering Technology

Hobbies:

- I enjoy music whether playing or listening. I can play three different musical instruments, to express jazz, concert, and classical music. In addition to music, I enjoy working with audio/video electronics fo cars, homes, and production studios.

Skills:

- Over the past ten years I have gained a great deal of knowledge about computer software and hardware. I have experience with the most common Microsoft Windows packages which include Windows XP, 2000, 98SE, 95, and 3.11. I have used software such as, Cool Edit, Flash, Swish, Visual Basic, Microsoft Studio C++, Office 2002, Coral 6, Money 2003. I know all the internal parts of a pc and I am able to rebuild and service computers.

Conferences

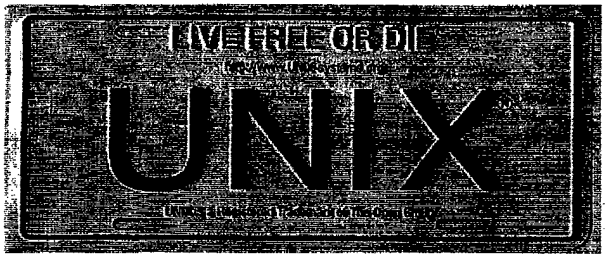
- 4th Expanding Opportunities Conference (Tallahassee, Florida)

Awards

- Poster Presentation at Florida A&M University

Software Tools for Signal Processing Support

Unix System Administration



Gathering Software Tools For Signal Processing Support

UNIX Team 2002 –2003
Mentors: Mr. Benjamin James, Math and Computer Science Department, Lester Hall room 215, bJames@adelphia.net
Dr. Linda Hayden - Math and Computer Science Department, Lester Hall room 115, 252-335-3696, http://nia.ecsu.edu/nrts/lhayden/haydenresume.html

Team Members:
Ramatoulie Bah – http://nia.ecsu.edu/sp/0203/rbah2002/home.html
Linwood Creekmore – http://nia.ecsu.edu/sp/0203/lcreekmore2002/home.html
Torreon Creekmore – http://nia.ecsu.edu/sp/torreon/PAGE.HTML
Vincent Davis - http://nia.ecsu.edu/sp/0203/vdavis2002/frame_2002.html
Demetrus Rorie - **http://nia.ecsu.edu/sp/0203/drorie2002/home.html**
Eunice Smith - http://nia.ecsu.edu/sp/0203/esmith2002/Ms_Smith%27s%20Web.htm

URL of Team Homepage – http://nia.ecsu.edu/onr/02-03/research/unix/frame_unix.html

Abstract

The Unix System Administration Team had two objectives for this research project. The Unix machines in room 115 were struck by lightning over the summer. The team with the help of Joey Gale and collaboration with the Networking Team learned about the problems and how repairs to the Unix machines were made. Two identified problems were that the motherboards were severely damage, and misconfiguration of the system setting.

The second objective was to initiate computer and software support for the Center of Excellence for Remote Sensing Education and Research (CERSER) Project. This will be done by using Wavelets, the concept of signal processing, and other transformation methods, Artificial Intelligence, C language and Java Libraries, and Parallel Virtual Machine (PVM), to link the team's SGI workstation into.

Troubleshooting
As was stated in the abstract, during the summer of 2002, the SGI's in room 115 were down due to severe weather impact, and part of our project for the academic year 2002 – 2003 was to go through all the machines and determined their problems and get them working again.

Some of the possibilities we considered were reloading the operating system, and get the root password so that we can access the system administration, and play around with the commands. We also listed memory errors, bugs, and disk write errors as possible causes of the system panic. After collaborating with Joey Gale for some time, the problem which was separated into two parts: software and hardware was solved by a SGI technician responsible for the software part of it together with Joey, and the hardware part of it was solved the networking team by changing the motherboards, network cards, and finally upgrading the Operating System.

Steps in solving:
Hardware part of it

i) The Networking Team changed the motherboards of the machines and reloaded the Operating System. This was one big step in solving the problem
ii) Network Cards were faulty and new ones were put in and configured.
iii) During the course of the configuration, the host files were incorrectly configured, but after accessing the root and changing the permissions, the machines were in good working condition.

Digital Signal Processing (sound processing capability)

What is DSP? DSP, or Digital Signal Processing, as the term suggests, is the processing of signals by digital means. A *signal* in this context can mean a number of different things. Historically the origins of signal processing are in electrical engineering, and a signal here means an electrical signal carried by a wire or telephone line, or perhaps by a radio wave. More generally, however, a signal is a stream of information representing anything from stock prices to data from a remote-sensing satellite.

In many cases, the signal is initially in the form of an analog electrical voltage or current, produced, for example, by a microphone or some other type of transducer. An analog signal must be converted into digital (discreet) form before DSP techniques can be applied. An analog electrical voltage signal, for example, can be digitized using an integrated electronic circuit (IC) device called an analog-to-digital converter or ADC. This generates a digital output in the form of a binary number whose value represents the electrical voltage input to the device.

Signals commonly need to be processed in a variety of ways. For example, the output signal from a transducer may well be contaminated with unwanted electrical "noise". The electrodes attached to a patient's chest when an ECG is taken measure tiny electrical voltage changes due to the activity of the heart and other muscles. The signal is often strongly affected by "mains pickup" due to electrical interference from the mains supply. Processing the signal using a filter circuit can remove or at least reduce the unwanted part of the signal. Increasingly nowadays the filtering of signals to improve signal quality or to extract important information is done by DSP techniques rather than by analog electronics.

The Unix Team will be using the DSP technology in order to record and monitor the migrations of whales within our oceans. This information will be beneficial to the Navy, as they will be able to perform numerous combat strategies and missile tests without the destruction of our marine life. The team will simply process the output signal into sound all taking place in real-time operations in order to determine the exact location of whales within the ocean, and hypothesize their expected routes. This will be accomplished by simply monitoring the different frequencies by which whales use to communicate, and rapidly compute their signal along a frequency spectrum. Their signal frequencies will be later compared to previous recorded whale frequencies to distinguish the actual signal frequencies from unwanted noise and pickup.

DSP technology is currently used in such devices as mobile phones, multimedia computers, video recorders, CD players, hard disc drive controllers and modems. An important application of DSP is in signal compression and decompression. In our case, for example, the signal recorded on the hard drive is in a compressed form (to increase storage capacity) and must be decompressed for the recorded signal to be reproduced.

Although the mathematical theory underlying DSP techniques such as Fast Fourier and Hilbert Transforms, digital filter design and signal compression can be fairly complex,

Software part of it:

Ethernet problem

The main problem of concern here was manual network configuration for the Ethernet network interface, and the goals were to:

- Configure the Ethernet network interface
- Configure network interface
- Configure netmask address
- Configure broadcast address
- Configure network card
- Setup network card

The networking team reached one of the goals which was configuring the Ethernet network, and the SGI technician did the rest

After all the major problems were solved, there were some minor ones. When a user logs in to his or her account, there was no desktop due to permissions on server. This was solved by adding r-w (read and write) permissions.

Procedure for manually configuring the network interface

Information that were needed in order to fix the problem were availability of IP address, the netmask of the network, and IP address of default gateway of dynamic routing is not available on network.

- New network cards put in and configured
- Desktop unavailable in user accounts due to permissions on server (solved by adding read-write permission)
- Host files configured incorrectly
- IP address for umfort added

The second part of the project was to process incoming data for the remote sensing team by using Fourier Transformers and signal processing, and what the Unix team was going to do for them was find out what form their data was coming in (raw or digital), what they were going to do with it, and provide them with the necessary software and filter the data. But after talking to them, we learned that they had it all done, so we had to shift plans: support signal processing.

the numerical operations required to implement these techniques are in fact very simple, consisting mainly of operations that could be done on a cheap four-function calculator. The architecture of a DSP chip is designed to carry out such operations incredibly fast, processing up to tens of millions of samples per second, to provide real-time performance: that is, the ability to process a signal "live" as it is sampled and then output the processed signal, for example to a loudspeaker or video display.

Parallel Virtual Machine (PVM)

PVM (Parallel Virtual Machine) is a software package that allows a collection of Unix workstations or Windows computers or both to be hooked together by a network and used cooperatively for parallel computation. It is the most popular software package used to combine networked computers. Using parallel processing increases the number of operations that a computer can execute. Supercomputers are a parallel virtual machine's equivalent; both perform the same task. However, a parallel virtual machine is a series of host computers virtually linked together through communications and software and a supercomputer physically links numerous microprocessors and memory banks together to make them perform as one. If you don't have a supercomputer, you link host computers together to make them act like a supercomputer, thereby creating a parallel virtual machine. The PVM software links host machines together to form a virtual machine or a single computer.

Parallel virtual machines are used to increase a machine's time complexity or how fast operations are executed. PVM helps speed up data processing by using several computers to perform one task. The limiting factor or speed limit on how fast operations are executed is the speed of light in the medium used to transmit electrical signals in the computer. Electrical signals representing the data or machine instructions must move from memory to the microprocessor's registers and back. This movement requires a finite amount of time.

To increase time complexity, multiple computers are used to execute one operation. Using parallel processing helps solve large computational problems quickly by increasing the computer's time complexity or clock cycle time. In addition to helping solve large problems, parallel processing also helps decrease the amount of revenue spent on memory because PVM uses the power and memory of many computers instead of one. Sites around the world are using PVM to solve important scientific, industrial, and medical problems. However these are not the only usages of PVM, it is also used as an educational tool to teach parallel programming.

Many features in the PVM software package help increase it's effectiveness. The Resource Management feature adds or deletes hosts from a virtual machine. The PVM resource manager provides handler functions to redirect the PVM calls to different machines when a host is deleted. The smallest unit of parallelism in PVM is a task. The Process Control feature spawns or kills tasks dynamically. Multiple tasks may be

assigned to execute on many hosts or on a single host. Another feature of PVM is Message Passing. This feature allows tasks to communicate explicitly by sending and receiving messages through the virtual machine. Dynamic Task Group is an additional feature, it permits task to create, join or leave a group at any time. With the Fault Tolerance feature in PVM, virtual machines automatically detect faults, or when a computer is no longer computing correctly and accurately, and adjusts the virtual machine to correct the problem.

The UNIX Team's objective was to obtain the software needed to install the PVM software onto the ONR Lab's SGI workstation, which are Unix machines. In order to accomplish this goal the PVM source code, libraries, documentation, and other software were needed. The UNIX Team has collected various forms of PVM related data and has documented its usages. We have composed a list of different websites that are related to PVM and also documented whom it will be most useful for. We have also found PVM tutorials and other documentations that will be useful to not only the Unix team, but also others wishing to learn more about PVM and the installation process.

In addition to finding the documentation we have also found the software needed to install PVM onto the Unix computers. We have downloaded the PVM source code and a PVM C++ Library to a specified ONR SGI workstation Unix computer. This software and the additional data collected will allow the UNIX Team to eventually install and execute PVM onto the Unix machines. The PVM software that has been downloaded onto the Unix machine is now accessible to anyone seeking PVM information. The Unix team members are continuing its efforts to install the PVM software and develop its SGI workstations into a parallel virtual machine.

ARTIFICIAL INTELLIGENCE (A I)

In researching signal processing and software that can support it, one topic of vast and complex history originated. The topic of artificial intelligence and what it is exactly. Artificial Intelligence is "the scientific understanding of the mechanisms underlying thought and intelligent behavior and their embodiment in machines," as defined by the American Association for Artificial Intelligence (1) on their website. The intellectual roots of AI, and the concept of intelligent machines, may be found in Greek mythology. Intelligent artifacts appear in literature since then, with real (and fraudulent) mechanical devices actually demonstrated to behave with some degree of intelligence.

After modern computers became available, following World War II, it has become possible to create programs that perform difficult intellectual tasks. From these programs, general tools are constructed which have applications in a wide variety of everyday problems. The individual who is credited with creating the "modern" concept of artificial intelligence is Alan Mathison Turing. In 1924, Turing published a paper proving that mathematics would always contain statements that could neither be proven nor refuted. As part of his argument, he envisioned a machine that could compute any number. This machine, which included a control unit and a memory, could perform several basic

actions: reading, writing or erasing symbols on a tape, and advancing or rewinding the tape (2). This simple "Turing machine" served as the model for all later digital computers. Now, the question of what a "Turing Machine" arises. A Turing machine is an abstract representation of a computing device. It consists of a read/write head that scans a one-dimensional or bi-directional tape divided into squares, each of which is inscribed with a 0 or 1. Computation begins with the machine, in a given 'state', scanning a square. It erases what it finds there, prints a 0 or 1, moves to an adjacent square, and goes into a new state. Basically, he envisioned a Modern Computing Device, or a computer.

In the span of years after World War II, the concept of Artificial intelligence gained popularity and numerous advances were made in research. This research constituted the distinguishing of the different types of Artificial Intelligence: Logical Artificial Intelligence, Search, Pattern Recognition, Representation, Inference, Common Sense Knowledge & Reasoning, Learning from Experience, Planning, Epistemology, Ontology, Heuristics, and Genetic Programming (3).

In the case of selecting the proper types of Artificial Intelligence to support signal processing, a combination of the branches must be used. Most likely, the branches that would be used would be Logical Artificial Intelligence, Pattern Recognition, search and possibly planning. The logical and planning artificial intelligence branches would handle the goals of the signal-processing project and map out specific ways to accomplish those goals. For example, if the goal of the Project were to attain a certain amount of information over a given period of time, the Artificial Intelligence Program would independently create solutions to the problem with the input of general information (3). Next would be the Pattern Recognition and its importance is obvious. With Signal processing, the pattern recognition would decipher the relevant data from the irrelevant data (3). Therefore, using Artificial Intelligence would prove beneficial for a number of reasons in a Signal Processing Project. It would not only save money but also time.

Libraries (Java)

Java is a programming language created during the 1990s whose original purpose was to program consumer devices. However, it became a flourishing way to write Internet applets. Today, Java is becoming popular because it is less expensive to support than other programming applications. The only requirement to run Java on any machine is that the Java virtual machine is on the computer; this can be easily loaded at no cost to the user.

Other programming languages, such as C, C++, and Fortran are often used for scientific calculations. One must have a compiler on his/her machine in order to run a program in C, C++ and some other programming languages. "The same Java program will run, without change, on Windows, UNIX, Linux, or the Macintosh" (*Big Java*, Cay

Horstmann). Yet, Java has been used to find Fast Fourier Transform, Chirp Z-Transform, and applied to many other mathematical and scientific formulas also.

One of our long-term objectives is to develop computer and software support for the Center of Excellence for Remote Sensing Education and Research (CERSER) Project. We would like to aid in evaluating audio data because the CERSER project has great software support in image processing. The audio we are referring to might consists of sounds by whales and other marine life that may be near military operations and various places that could cause them harm.

Signal processing can be analyzed and displayed using java coding. This has been accomplished and innovative programmers are working on improving the process. When solving higher performance scientific calculations, the advanced features and libraries of the language must be used. For this reason, we researched java libraries and websites that may be useful in our endeavor.

"The Colt Distribution" is the set of java libraries that we downloaded to one of the Unix machines. It consists of several source libraries for high performance scientific and technical computing. The libraries included tools useful for basic and advanced mathematics, statistics and other types of computing. Intensive linear algebraic computations, *Gamma* functions, *Beta* functions, and probability distributions are examples of problems that can be solved using the saved libraries.

Here is a listing of several websites that may be useful references.

Digital Signal Processing
http://www.dsptutor.freeuk.com/
- This page contains java applets which may be useful to our project and a tutorial on digital signal processing

Fourier Synthesis
http://www.nst.ing.tu-bs.de/schaukasten/fourier/en_idx.html
- Contains mathematics of Fourier synthesis; contains link to java code which displays the applet on the page

Javanumerics
http://math.nist.gov/javanumerics/
- Information on numerical computing in Java; contains several related links

Java Digital Signal Processing (J-DSP) editor
http://www.eas.asu.edu/~midle/jdsp/jdsp_faq.html
- This website may be very useful because it is an Internet-based signal processing laboratory designed to provide students with hands-on learning.

Java Programming Resources
http://www.apl.jhu.edu/~hall/java/#Free-Java-Programming-Tools

- This page contains links to various java resources for users on various levels

Java Resources for Science and Engineering
http://www.npac.syr.edu/projects/tutorials/JavaCSE/
- This page contains resources related directly to using java for computations

Java as a Scientific Language, part 1
http://www.developer.com/java/ent/article.php/631151
- This article discusses how java is useful for scientific purposes

Java Pro Magazine – Javatecture
http://archive.devx.com/upload/free/features/javapro/2002/03mar02/jt0302/jt0302-1.asp
- Reasons why one would use Java for computational methods

Joel Feldman's Java Server
http://www.math.ubc.ca/~feldman/java.html
- This page has links to several applets of scientific calculations, java tutorials, and many other very useful sites.

The Colt Distribution
http://hoschek.home.cern.ch/hoschek/colt/index.htm
- "Open Source Libraries for High Performance Scientific and Technical Computing in Java"; this site should be very useful in our project

The DSP Design Performance Code Segments, Tutorials, and Papers Page
http://www.nauticom.net/www/jdtaft/papers.htm
- This page has java code for solving several calculations, including Fast Fourier Transform and the Chirp Z-Transform.

Zoran Budimlić
http://www.cs.rice.edu/~zoran/
- This is the web page of someone that I can use as a reference; see his paper on "Optimizing Java: Theory and Practice"

UNIX CONFIGURATION

Workstation Name:	Kuumba.cs.ecsu.edu
Model:	O2
Serial Number:	0800 6910 0466
IP Address:	10.32.4.45
Ethernet Address:	08:00:69:10:04:66
CPU:	1 300MHz MIPS R12000(IP32) Processor with MIPS R12010 FPU

Main Memory:	256 MB
Data Cache:	32 KB
Instruction Cache:	32 KB
Secondary Instruction-Data Cache:	1 MB
Operating System:	IRIX Release 6.5

Workstation Name:	Kia.cs.ecsu.edu
Model:	O2
Serial Number:	0800 6905 AE07
IP Address:	10.32.4.42
Ethernet Address:	08:00:69:05:AE
CPU:	1 225MHz MIPS R10000(IP32) Processor with MIPS R10010 FPU
Main Memory:	128 MB
Data Cache:	32 KB
Instruction Cache:	32 KB
Secondary Instruction-Data Cache:	1 MB
Operating System:	IRIX Release 6.6

Workstation Name:	Ujamaa.cs.ecsu.edu
Model:	O2
Serial Number:	0800 0910 02E6
IP Address:	10.32.4.44
Ethernet Address:	08:00:69:10:021E6
CPU:	1 300MHz MIPS R1200(IP32) Processor with MIPS R12010 FPU
Main Memory:	256 MB
Data Cache:	32 KB
Instruction Cache:	32 KB
Secondary Instruction-Data Cache:	1 MB
Operating System:	IRIX Release 6.5
Network:	Integral Ethernet: ec0, version 2

Workstation Name:	Dissi.cs.ecsu.edu
Model:	O2
Serial Number:	0800 6905 BE85
IP Address:	10.32.4.42
Ethernet Address:	08:00:69:05:0E
CPU:	1 300MHz MIPS R12000(IP32) Processor with MIPS R1201 FPU
Main Memory:	256 MB

Data Cache:	32 KB
Instruction Cache:	32 KB
Secondary Instruction-Data Cache:	1 MB
Operating System:	IRIX Release 6.5
Network:	Integral Ethernet: ec0, version 2

Future Work

The team just has just started building the foundation of knowledge that will be needed to support CERSERS's data and imaging capabilities. The team would like to continue developing sound processing capability that could be used to monitor whales. This would extend CERCERS's capability in processing and filtering their data and signals. Each individual area: Digital Signal Processing, Artificial Intelligence, Parallel Virtual Machine, and Java libraries, should be researched further. Parallel Virtual Machine needs to be installed and run on the Unix machines to gain experience in solving problems on a parallel machine.

The techniques of DSP need to be studied and understood so that only the techniques useful are investigated further. DSP software needs to be located, downloaded, and exercised to continue building the knowledge base. The same needs to be done for AI. Future researchers need to start programming with the Java libraries to gain experience to support the signal processing. In all cases, free software supporting all areas of our project needs to be downloaded to provide experience and new ideas.

Benjamin Burnham James, III
113 Hunter's Trail West
Elizabeth City, NC 27909-3266
252-335-2247 (home)
E-mail: bjames@adelphia.net

Synopsis:

Mr. James has over 25 years of experience in computer programming and solving the mathematical problems arising in the design and analysis of aerospace systems including multidisciplinary and multilevel design optimization, finite element analysis, testing and maintenance engineering. He also has extensive experience in the management of aviation logistics support and industrial facilities such as Naval Aviation Depots. His

background includes teaching and implementing management concepts such as Total Quality Management, Manufacturing Resource Planning II, Theory of Constraints, and preparing industrial organizations for ISO 9000 registration efforts.

Education and Military Service:

1978 ME, Civil Engineering	Old Dominion University
1973 BS, Aerospace Engineering	North Carolina State University
U.S. Coast Guard Reserve:	6 months active/12 years reserve duty
U.S. Naval Reserve:	20 years reserve duty
Current Rank:	Commander

Experience:

Aug 2002 – Present: Elizabeth City State University, Elizabeth City, NC, Math Instructor, 10 hours per week. Supervisor: Dr. Georgia Lawrence. Taught courses in college algebra and mentored a student research group turning a collection of Silicon Graphics workstations into a virtual parallel computer.

Mar 2001 – Dec 2001: TEE-LOK, Inc., Soundside Drive, Edenton, NC 27932, Engineering Programmer, 40 hours per week. Supervisor: Mr. Dave Largent, 252-482-7000. Developed and programmed new capability for TEE-LOK's roof truss design program. Specifically, developed a module to generate wind loads in compliance with ASCE 7-98 building design code.

Apr 2000 – Mar 2001: Support Systems Associates, Inc., Pembroke 4, Suite 517, Virginia Beach VA 23462, Logistics Manager, 40 hour per week. Supervisor: Mr. Gary Richard, 757-490-1626. Responsible for all logistics analysis for the USN Jet Engine Test Initiative, the Navy's new digital jet engine testing equipment. Also responsible for all computer hardware and software support in the office.

Oct 1998 - Jan 2000: Aviation Engineer, Soza & Company, LTD., 905 Halstead Blvd., Elizabeth City, NC 27909, 40 hours per week. Supervisor: Mr. Stan Walz, 252-338-2511. Assigned to the Business Redesign Project at the U.S. Coast Guard ARSC Facility in Elizabeth City, NC. Responsible for advising all redesign teams on ISO 9000 issues to ensure that all efforts would be directly applicable towards an ISO 9000 registration effort. Developed an automated document control system using Microsoft Office products. Also served as senior advisor on all computer related issues, including software and hardware, for the Elizabeth City staff.

Aug 1998 - Oct 1998: Car Sales/Financial Manager Trainee, Perry Toyota, 1002 Halstead Blvd., Elizabeth City, NC 27909, Approximately 70 hours per week. Served as salesman to gain experience in the car sales business prior to being trained as a financial manager.

Sep 1996 - Aug 1998: Self-employed Consultant: Approximately 5 hours per week. Performed consulting work for several small companies. These companies included construction companies and building supply companies. Much of the work was computerizing their operations. Advised the companies on buying computers and trained the employees to use the equipment. Additional computer related work included writing specific application software for invoices, job cost estimating, and bid proposals.

List of Publications
of
Benjamin B. James

A Multidisciplinary Approach to Optimization of Controlled Space Structures: Third Air Force/NASA Symposium on Recent Developments in Multidisciplinary Analysis and Optimization Sept. 1990.

Multidisciplinary Optimization of Controlled Space Structures with Global Sensitivity Equations: NASA TP 3130, Nov. 1991.

Multidisciplinary Optimization of a Controlled Space Structure using 150 Design Variables: AIAA Paper No. 92-4754, Fourth AIAA/USAF/NASA/DAI Symposium on Multidisciplinary Analysis and Optimization, Sept. 1992. Also published as NASA CR 4502, Feb. 1993.

Linda Bailey Hayden, PhD
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email: lhayden@umfort.cs.ecsu.edu

EDUCATION

- NSF-UFE, ADVANCED COMPUTER NETWORKS 1998, Michigan State Univ.
- NSF-UFE, COMPUTATIONAL SCIENCE 1993-94, NC Supercomputer Center, Triangle Park, NC
- NSF-UFE, PARALLEL PROCESSING 1992-93, Colgate University, Hamilton, NY.
- NSF-UFE, COMPUTER GRAPHICS 1990 & 1993, University of Georgia, Atlanta, GA.
- NSF-UFE, SOFTWARE ENGINEERING 1990, University of Georgia, Atlanta, GA.
- PH.D MATHEMATICS/EDUCATION 1988, American Univ., Washington, DC.
- M.S. COMPUTER SCIENCE 1983 Old Dominion University, Norfolk, VA.
- M.A. MATHEMATICS/EDUCATION 1972 University of Cincinnati, Cincinnati, Ohio.
- B.S. MATHEMATICS/PHYSICS 1970 Virginia State University, Petersburg, VA.

TEACHING EXPERIENCE

- DIRECTOR, Center of Excellence in Remote Sensing Education and Research, ECSU, 2002 - present
- PROFESSOR OF COMPUTER SCIENCE (tenured), 1989-present, Elizabeth City State University.
- ASSOCIATE PROFESSOR OF COMPUTER SCIENCE, 1988-89, Univ. of the District of Columbia.
- VISITING PROFESSOR OF COMPUTER SCIENCE, 1985-88, American Univ., Washington, DC.
- ASSISTANT PROFESSOR OF COMPUTER SCIENCE, 1980-85, Elizabeth City State University.
- ASSISTANT PROFESSOR OF MATHEMATICS, 1979-80, Norfolk State University, Norfolk, VA.
- VISITING PROFESSOR OF MATHEMATICS, 1976-78, University of Kentucky, Lexington, KY.
- INSTRUCTOR OF MATHEMATICS, 1972-76, Kentucky State University, Frankfort, KY.

PROFESSIONAL ACTIVITIES

- IEEE Geoscience & Remote Sensing Society Education Committee 2002 – present

Management consulting to a construction firm included developing schedules, managing Change Orders and representing the firm during preliminary pre-bid meetings and safety meetings.

Oct 1995 - Sep 1996: Maui Analysis and Synthesis Technologies, Inc. (DiagSoft, Inc.), 5615 Scotts Valley Drive, Suite 140, Scotts Valley, CA 95066. Principal Investigator, 40 hours per week. Served as the Principal Investigator on a Small Business Innovative Research (SBIR) grant from the U.S. Air Force entitled "Exploiting Parallelism to Enhance the ASTROS Multidisciplinary Design System." This grant determined ways in which parallel computers and algorithms could increase the capabilities of the automated aircraft design software system, ASTROS. The duties included performing research to take advantage of the newest parallel computers such as the IBM SP/2 and parallel computational algorithms in the fields of structural and aeroelasticity analysis and design. Also coordinated the efforts of subcontractors who were researching methods to use nonlinear computation fluid dynamics (CFD) to enhance the abilities of the ASTROS system. Computational work was performed on the Maui High Performance Computing Center's IBM SP/2.

Jan 1995 - Oct 1995: Computer Sciences Corporation, 3217 N. Armistead Ave., Hampton, VA 23666-1379. Computer Scientist, 40 hours per week. Provided engineering support to the NASA/LaRC High-Speed Parallel Computing and Communications Project (HPCCP) in the design, development and implementation of a Framework for Interdisciplinary Design Optimization (FIDO). Performed integration of structural, aerodynamics, propulsion and performance analyses into a single system to perform optimal design of high speed transports.

Oct 1989 - Dec 1994: Lockheed Engineering and Sciences Company, Research Drive, Hampton, Va 23666. Staff Engineer, 40 hours per week. Provided engineering support to the NASA/LaRC High Speed Parallel Computing and Communications Project (HPCCP) in the design, development and implementation of a Framework for Interdisciplinary Design Optimization (FIDO). Performed integration of structural, aerodynamics, propulsion and performance analyses into a single system to perform optimal design of high speed transports. Provided engineering support to the NASA/LaRC Structures Directorate, Interdisciplinary Research Office and Controls-Structures Interaction Office in the design, development, and implementation of an integrated, multidisciplinary design program for space platforms. Developed a single system combining structural and control system analyses to perform optimal design of orbiting vehicles.

Military Experience:

Operation Desert Storm: Served as Officer-in-Charge of the Naval European Repair and Rework Activity Representative, Alverca, PO. Administered a contract with the Portuguese Air Force for the repair and overhaul of C-130, C-2, CT-39 and P-3 aircraft for the U.S. Navy and T-56 engines for the U.S. Air Force. In addition to overseeing the routine overhaul and repair of the mentioned aircraft, was responsible for the emergency repair of the same.

- Consultant on Program Evaluation for the UDC Navy Pre-college Program, 1988

PROFESSIONAL PRESENTATIONS

- Hayden, L, *Mathematics of The Great Dismal Swamp Product Development for NASA's Educational Product Review*, Coalition for Earth Science Education Seventh Annual Meeting, Goddard Space Flight Center, Jan 10-13, 2002
- Hayden, L, Seshun A. *Remote Sensing Middle School Intervention Program-YBTS*, Coalition for Earth Science Education Seventh Annual Meeting, Goddard Space Flight Center, Jan 10-13, 2002
- Hayden, L, *You Be The Scientist With Satellite Imagery*, IEEE Geoscience and Remote Sensing IGARSS 2001 Conference Proceedings, Sydney, Australia, July 2001
- Hayden, L, *Celebration of Women in Mathematics for High/Middle School Girls*, Science House at NCSU Conference on K-12 Outreach from University Science Departments. Feb 7-9, 2001 Raleigh, NC
- Hayden, L, Seshun, A., *Goes Satellite Data GOES to School*, NASA's MU-SPIN 10th Annual Users Conference, Atlanta, GA Sept. 2000
- Hayden, L, Powers, M., *The Great Dismal Swamp Earth System Science Academy*, IEEE Geoscience and Remote Sensing IGARSS 2000 Conference Proceedings, Honolulu, Hawaii, July 2000
- Seshun, A., Steele, K., Hayden, L., *The Kaleidoscope of Numbers in Satellite Infrared Imagery*, Proceedings of the National Science Teachers Association Conference, St. Louis, MO, March 21-24, 2001
- Hayden, L, Atalla, S., *Introductory Physics CBT Training Model for the University of Cairo*, CBT Authoring Meeting, Cairo, Egypt, June 1999
- Hayden, L, Saunders, S., Ethernet vs. ATM: *Timing Study of Search and Sort Algorithms*, The National McNair Journal Fall 1996, p 19
- Hayden, L., Association of Computer and information Sciences/Engineering Departments at Minority Institutions Conference July 24-28, 1996 Mayaguez, Puerto Rico
- Hayden, L., Seaton, J., Brooks, S. *Integration of the Internet into the Secondary School Curriculum*, Guilding Gifted Talent in Science and Technology, Oct. 25-26, 1996, Norfolk State Univ. Norfolk, VA
- Hayden, L., Seaton, J. *Implementation of the ATLAS program for Secondary School Connectivity within the ECSU-NRTS*, 6th Annual NASA MU-SPIN Conference, Sept. 18-24, 1996, El Paso, TX
- Hayden, L., *Department of Transportation STEP Program Internship Report* ,ITS Consortiums Intern and Educaitonal Development Meeting Sept. 20, 1995 Hampton, VA
- Hayden, L., *Using Research to Teach Technology to Undergraduates*, NC Academy of Science Conference, 1995
- Hayden, L. AND Coleman, *Intervention Programs for High Ability Minority Students*, NASA-HBCU Space Science and Engineering Research Forum, 1988
- Hayden, L., Symposium *Evaluation of the Saturday Academy Program located at The University of the District of Columbia Campus*, on Intervention Programs Aimed at Increasing Minority Participation in Mathematics Based Fields, 1988
- Hayden, L. and Coleman, W., *Successfully Keeping Minority Students in the Math/Science Pipeline* TRIO Programs Annual Conference, 1989
- Hayden, L., "Evaluating Intervention Programs" Science, Mathematics, Aeronautics, Research and Technology Interface Group of the National Leadership Roundtable Conference (SMART), 1989
- Hayden, L., Mathematics Association of America, Maryland/DC/Virginia Fall meeting, 1988

MEMBERSHIP

- IEEE Geoscience and Remote Sensing Society
- Association of Computing Machinery (ACM)
- ACM Significant Interest Group in Computer Science Education (SIGCSE)

- IEEE Geoscience & Remote Sensing Society Data Archival and Distribution Committee 2002-present
- Expanding Opportunities in Oceanic, Environmental and Atmospheric Science Steering Committee
- Educator of the Year Award, National Technical Association 75 Anniversary Conference, Atlanta, GA
- Board member, Association of Departments Of Computer/Information Sciences and Engineering at Minority Institutions (ADMI)
- Mentor, Harvard Society of Black Scientist and Engineers, Harvard University Cambridge, MA, 2001
- IEEE Geoscience and Remote Sensing Society Minority Travel Program Selection Committee
- SEA Education Association Diversity Workshop Participant, Summer 2002
- Featured in Black Creativity 2000 Exhibit at The Chicago Museum of Science and Industry
- Principal Investigator, NASA-Network Resources and Training Site, 1995-present
- Principal Investigator, ONR- Nurturing ECSU Research Talent Programs, 1991-present
- Principal Investigator, NASA-Mathematics of The Great Dismal Swamp Project, 1999-present
- Principal Investigator, NASA-You Be The Scientist With Satellite Imagery Project, 1999-present
- Principal Investigator, ONR-Ocean/Marine Science Undergraduate Research Experience, 2001-present
- NAFEO High Tech Expo Chair of Undergraduate Research Poster Session 1997-present
- Ronald McNair Undergraduate Research Program, Coordinator of Research, 1996-1998
- IEEE-ASEE Fellow, NASA's Langley Research Center, Hampton, VA 1996
- Computer Science Councilor, National Council on Undergraduate Research, 1995-98
- Proposal Reviewer, NASA, PACE/MSET Program, 1996
- Evaluation Chairperson, ACM/SIGCSE'96 Conference 50th Anniv. of the "Firing of the Eniac"
- Computer Visualization Session Chair, ACM/SIGCSE 1994, Phoenix, AZ.
- Proposal Reviewer, American Association of University Women Dissertation and Post-Doctorial Proposals, Washington, DC 1993, 1994
- Referee, Papers submitted to the 1993, 1994 ACM/SIGCSE conference
- Published Interview, "A Winning Formula", American Magazine, Winter 1994, p.15-20.
- Published Interview, "Success is in the Numbers", Black Issues in Higher Education,
- May 19, 1994, p. 40-43
- Presenter, "Mentoring Minority Students Majoring in Mathematics and Science", 9th International Conference on Technology and Education Paris, France, 1992
- Poster Session Chair, ACM/SIGCSE, 1991 Conference, San Antonio, TX.
- Proposal Reviewer, NSF-Instrumentation and Laboratory Improvement Program, 1991
- Proposal Reviewer, NSF-Undergraduate Curriculum and Course Development Program, 1991
- Textbook Reviewer, Introduction to Computer Science: Programming Problem Solving and Data Structures Nance/Naps authors, West Publishers, 2nd Ed. 1991 ISBN 0-314-54007-5
- Author of A Successful Intervention Program for High Ability Minority Students, School Science and Mathematics Journal, April 1990
- Author of TRIGONOMETRY, a workbook used by the University of North Carolina at Chapel Hill, Office of Extension
- Author of INTEGER ARITHMETIC, a BASIC language based computerized drill and practice package
- Author of INTRODUCTION TO ALGEBRA, an IDAF based computerized tutorial package (developed under a MISIP grant)
- 1986 Summer CS Fellow with the Department of the Army, AMC, Alexandria, VA
- 1985 Summer CS Fellow with the Department of the Army, ATSC TRADDOC, Fort Eustis, VA
- 1984 Summer CS Fellow with the Central Intelligence Agency, OTS, Langley, VA
- Recipient, North Carolina State Board of Governors Faculty Study Award, 1982
- Recipient, Graduate & Professional Opportunities Program Fellowship, 1985 & 1986
- Recipient, Patricia Robert Harris Graduate Fellowship, 1987 & 1988

- Elizabeth City State University, August 1999-present
- Majors: Computer Science and Physics
- Concentration: Scientific
- GPA: 3.78
- Expected Graduation Date: May 2003

EXPERIENCES

- Summer 2002, North Carolina State University, Did research on "Quartz Crystal Oscillations in Liquids : Comparison of Theory and Experiment" under the mentorship of Dr. krim.
- Summer of 2001, Center for NASA and Research and Training at South Carolina State University (Undergraduate Research in Astrophysics), and my research topic was " Clustering of Galaxies" under the mentorship of Dr. Smith.
- Spring 2001,ONR/NRTS Program at ECSU,"Tunneling of Matter Wave Through a Delta Function Type of Barrier" , under the mentorship of Dr. Choudhury.
- Spring 2000, ONR/NRTS Program at ECSU, "The Motion of a Harmonic Oscillator Under the
Influence of a Derivative Type of Delta Fores".
- April 2000 - June 2000,Trainer in basic Computer skills at the River City Community Center.
- June 2000- July 2000, Worked with the MSEN Pre-college program at Elizabeth City State University

COMPUTER SKILLS

- C++
- Microsoft Office
- HTML
- Java
- Page making
- UNIX

CONFERENCES

- NAFEO 2000 - 02/15/00, Washington DC
- 10th Annual SOARS(Siezing Opportunities for Advancing Research Scholars)) Conference- 12/01/00, Winston-Salem State University, Winston Salem , NC
- National Technical Association 73th Annual Conference- 09/27-29/01, Atlanta, GA
- 11th Annual SOARS Conference-11/09/01, North Carolina Central University, Durham, NC
- Sigma Xi Student Research Symposium - 11/10/01 , Raleigh, NC
- National Technical Association 74th Annual Conference - 09/26/02, Las Vegas, ND

ACTIVITIES

- ACM Significant Interest Group in Computer Graphics (SIGGRAPH)
- Kappa Mu Epsilon Mathematics Honor Society
- Beta Kappa Chi Scientific Honor Society
- Alpha Kappa Alpha Sorority, Inc.
- Portsmouth Chapter of The LINKS Inc.

RESEARCH ACTIVITIES--FUNDED

- Principal Investigator, Office of Naval Research-AVHRR-SST Coastal Observations 2001-2003, $1,295,000
- Principal Investigator, Office of Naval Research-Nurturing ECSU Research Talent Program, 1993-2003, $2,516,000
- Principal Investigator, ONR Undergraduate Research Experience in Ocean/Marine Science, 2001-2004, $250,000
- Principal Investigator, NASA-Network Resources and Training Site, 1995-2004, $3,700,000
- Principal Investigator, NASA Earth Science Education Office-Math of the Great Dismal Swamp, 1999-02, $305,998
- Principal Investigator, NASA Earth Science Education Office- Satellite Imagery in EC/EZ K-12, 1999-02, $285,000
- Principal Investigator, NASA Earth Science Education Office- Earth Science On-Line Courses, 1999-02, $40,000
- Co-Principal Investigator, Dept of Transportation-Expanding Skills & Interest in Transportation 1993-95, $80,000
- Principal Investigator, National Security Office - CBT-Authoring in UNIX DOS and Networks, 1992-95, $165,900
- Principal Investigator, Office of Naval Research - Instrumentation for Educational Use 1995-96, $297,090
- Principal Investigator, Office of Naval Research - Home Institution Support, 1990-94, $123,400
- Principal Investigator, National Security Office, On-Line Manual Research Project, 1991-93, $74,800
- Co-Principal Investigator, Egyptian CBT-Authoring with the University of Cairo, 1997-98, $50,000
- Principal Investigator, Association of Women in Mathematics-High School Math Day 1994-01, $10,000
- ACM/SIGGRAPH Educators Grant, 1991 and 1994, $2,000

Ms Ramatoulie Bah

Campus Box 672, Elizabeth City, NC 27909
Phone (252)331-8708
Fax (252)335-3790
toulie_99@yahoo.com
bah@umfort.cs.ecsu.edu

OBJECTIVE- Pursue MS in Materials Science research, and eventually Medical Physics.

EDUCATION

Education
August 2000-present Elizabeth City State University
Elizabeth City, NC
- Physics major/Mathematics Minor
- Freshman GPA=3.215
- Graduation expected May 2004

Aug. 1996-June 2000 Northeastern High School
Elizabeth City, NC
- College Preparation
- GPA= 2.8
- Graduation Date=June 2000

Awards received
- Incentive Scholarship
- Center for Materials Research Scholarship
- ONR/NASA Research Program Scholarship
- 2002 SOARS Research Award

Work experience
- Sept 2002-Present - Student Government Association (Corresponding Secretary)

Serve as Executive Assistant To President Damiyon Sledge
- May 2001-Present - Wright Brothers National Memorial

Inform visitors on History of the site and also collect fees.
- August 2000-May 2001 - Elizabeth City State University Tutor

Assist Students with schoolwork and basic principles learned in class.
- April 98-May 2000 - Kmart Department Stores

Assist Customers with merchandise selection and handling.

Extracurricular activities
- ECSU University Choir First Tenor
- Freshman Student Chief Justice
- Essence of Praise Gospel Choir (Tenor)
- Society of Physics Students
- National Technical Association
- Student Government Association

VINCENT AUGUSTUS DAVIS, JR.
ECSU CAMPUS BOX 214 - 1704 WEEKSVILLE ROAD - ELIZABETH CITY, NC 27909
CAMPUS: 252-331-8803 - CELL: 757-537-4421 - EMAIL: VJ_DAVIS@YAHOO.COM
http://nia.ecsu.edu/sp/0203/vdavis2002/frame_2002.html

CTIVE

- Undergraduate Physics Researcher at Elizabeth City State University 1999 to present.
- President Society of Physics Students -ECSU chapter
- Alpha Chi Honor Society
- Math and Computer Science Club
- Concerned Black Awareness Club
- Library Club

MEMBERSHIPS

- National Technical Association
- Optical Society of America
- American Physical Society
- NSBPS- National Society of Black Physics Students
- IEEE

HONORS

- National Dean's List ('00,'01,'02)
- All-American Scholar, 2000 - 2001
- Office of Naval Research Scholars Award, April '00,01,02
- Office of Naval Research NERT Program Award, November '01,'02
- Recepient the Chancellor's Emblem Award, April '00,'02
- Excellence in Physics Award -presented at ECSU Honor's Convocation , April 18th 2002
- ATOM (Accentuating Technical Opportunities For Minorities) Project Academic Achievements Award,

April 19th 2001
- Rochelle Cleaners Excellence in Physics Award - April 18th, 2002
- Who's Who Among Students in American Universities & Colleges , 2001-2002

REFERENCES
Furnished upon request

Linwood Creekmore, III

Phone (252) 337-6112
Mobile Phone (252)267-0815
E-mail: lcreekmore@mail.ecsu.edu
linwood_c@hotmail.com

4014 Timmerman Drive
Elizabeth City, NC 27909

Objective
To gain more knowledge in the field of physics and mathematics.

CAREER OBJECTIVE:

To obtain a summer internship or position that will provide practical experience in mathematics and computer programming.

EDUCATION:

Elizabeth City State University
- Candidate for Bachelor of Science in Applied Mathematics (exp May 2004)
- Minor: Computer Science
- G.P.A.: 3.7/4.00 (As of Fall 2003)

Campus Box 549
1704 Weeksville Rd.
Elizabeth City, NC 27909
edsmith@mail.ecsu.edu

203 Bonney Terrace
Portsmouth, VA 23704
smylie_1999@yahoo.com

RELEVANT COURSES:

Calculus & Analytical Geometry II, Computer Science II, Linear Algebra, University Physics I, Assembly Language, Modern Programming (JAVA)

WORK EXPERIENCE:

9/2001 to 5/2002 Elizabeth City State University, Elizabeth City, NC

- Served as a peer tutor in the following mathematics courses: College Algebra, Pre-Calculus, Calculus I.

6/2002 to 8/2002 Purdue University, West Lafayette, IN
- RISE Scholar. Conducted a project charged with altering and building web pages for the Electrical and Computer Engineering Graduate Program.
- Worked on team to build a thermoelectric cooling system.

5/2001 to 8/2001 Fermi National Accelerator Laboratory, Batavia, IL
- Summer Intern. Expanded a Perl program to improve a web page for a research experiment at Fermilab.

6/2000 to 8/2000 Coastal Training Technologies, Inc. , VA Beach, VA
- Summer intern as "Multimedia Producer". Contributed to the production of CD-ROM courses produced by *Clarity Multimedia* department of Coastal Training Technologies.

AWARDS & HONORS:

o obtain a position with opportunities to grow and develop in the field of Astrophysics.

:DUCATION

UGUST 1999 - PRESENT	Elizabeth City State University; Elizabeth City, NC *Candidate for the Bachelors of Science in Physics* Cumulative GPA: 3.938 (As of Spring 2002)
EPTEMBER 1995 - JUNE 1999	I.C. Norcom High School; Portsmouth, VA *Graduated Cum Laude* Cumulative GPA: 3.562

NTERNSHIP/RESEARCH EXPERIENCE

IAY 28, 2002 - AUGUST 2, 2002	NASA Goddard Space Flight Center; Greenbelt, MD *Summer Intern, Summer Institute in Engineering & Computer Applications (SIECA) Program* • Conducted a research project entitled "Microcalorimeters In Astro-E2 & Constellation-X."
UGUST 2001 - PRESENT	Elizabeth City State University; Elizabeth City, NC *Researcher, Department of Physical Sciences* • Conducting research on project entitled "National Renewable Energy Laboratory (NREL) at ECSU.
JNE 4, 2001 - UGUST 11, 2001	University of Arizona; Tucson, AZ *Summer Intern, Undergraduate Research Program in Astrophysics (URPA)* • Conducted research project entitled, "An Amateur Search For Near-Earth Asteroids."
JNE 4, 2000 - JLY 28, 2000	South Carolina State University; Orangeburg, SC *Summer Intern, Undergraduate Research Institute in Astrophysics (URIA)* • Conducted research project entitled, "Investigations of A Toy Model of Dark Matter Clustering."
UGUST 1999 - RESENT	Elizabeth City State University; Elizabeth City, NC *Student Researcher, Office of Naval Research/NASA Program* • Conducted research projects that were on the basis of Physics.

:ONFERENCES ATTENDED

lational Technical Association 76th Annual Conference
eptember 24 - 27, 2002; Las Vegas, NV (Presentation Made)

ocus 2002
anuary 13 - 18, 2002; Georgia Institute of Technology - Atlanta, GA
igma Xi 2001 Student Research Symposium
lovember 10, 2001; Raleigh, NC
lational Technical Association 75th Annual Conference
eptember 27 - 29, 2001; Atlanta, GA (Presentation Made)

IEMBERSHIPS

ounding Secretary - ECSU/National Society of Black Engineers
ice President - Society of Physics Students Association
esearcher - ONR-NASA Research Program
lational Technical Association
CSU Honors Program
lpha Chi Honor Society

REFERENCES AVAILABLE UPON REQUEST

Eunice D. Smith

- Computer trouble-shooting
- Programming Using C++

HONORS/AWARDS: Chancellor's List

EXTRACURRICULAR ACTIVITIES:
INROADS
Office of Naval Research Program (ONR/NASA Program)

REFERNCES: Available Upon Request

Chancellor's List
Researchers Consortium, Minority Access, Inc Scholarship program
ONR/NASA Research Scholarship Program

EXTRACURRICULAR ACTIVITIES:
Math and Computer Science Club
National Technical Association
University Choir

References Available upon Request

DEMETRUS RORIE

Campus Address
Campus Box 285
1704 Weeksville Rd.
Elizabeth City, NC 27909
(252) 331-8222

Permanent Address
608 Cuthbertson St.
Monroe, NC 28110
(704) 283-5061
dmrorie@mail.ecsu.edu

OBJECTIVE: To gain work experience while working at a company as an intern

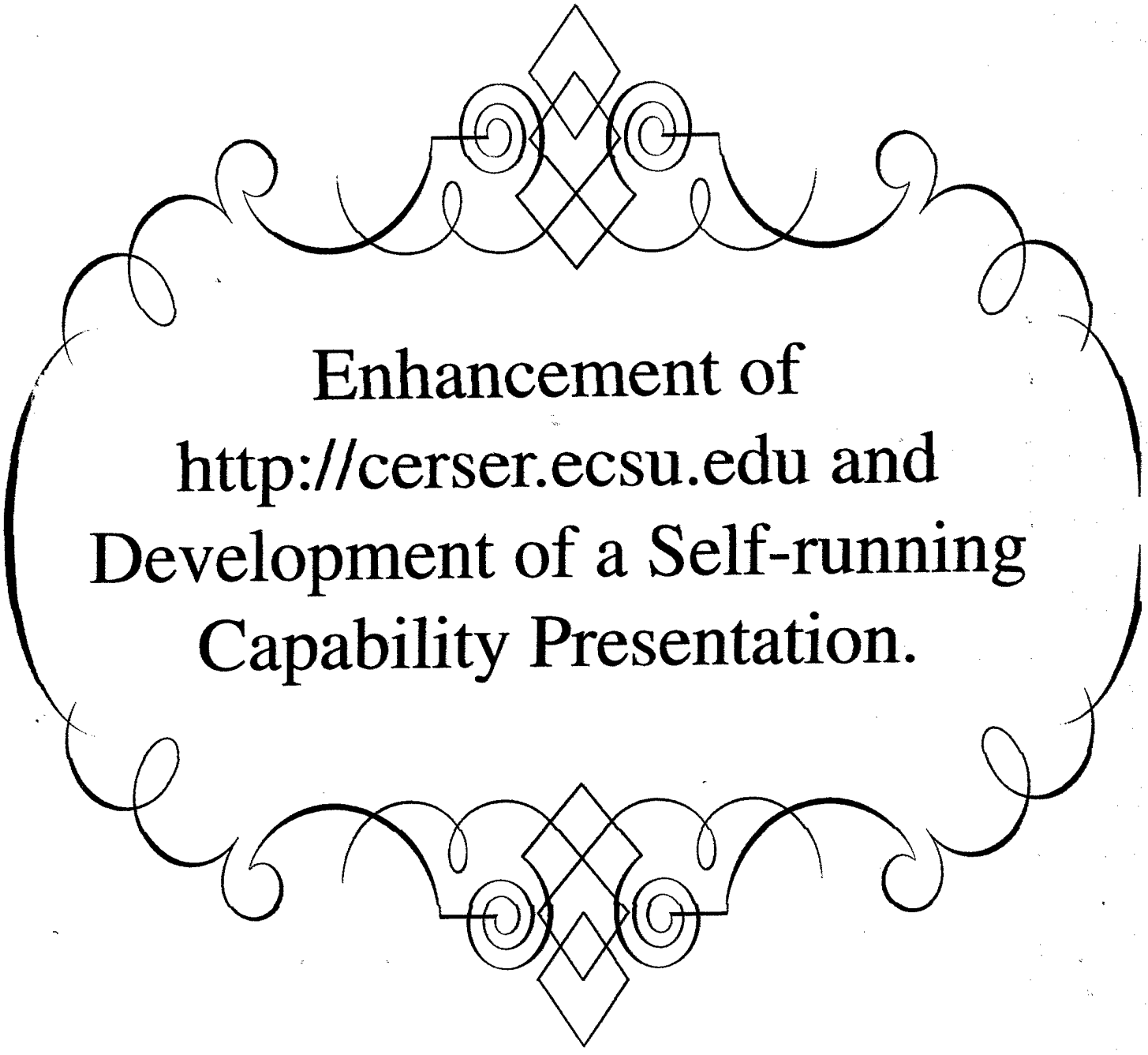
EDUCATION: B.S., Computer Science: Minor Concentration: Scientific
Elizabeth City State University, Elizabeth City, NC
Expected Date of Graduation: May 2006: GPA 4.0/4.0

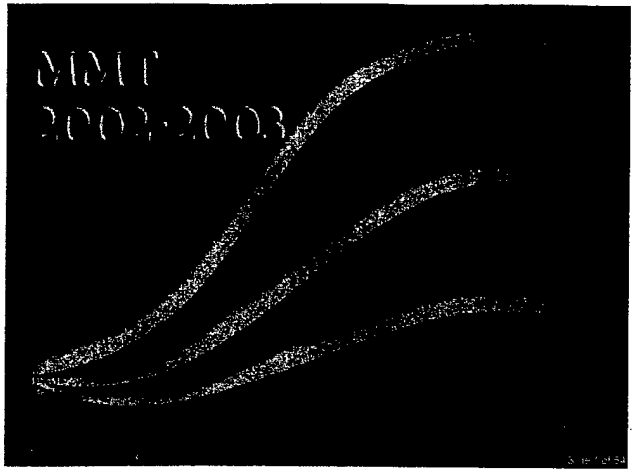
EXPERIENCE:

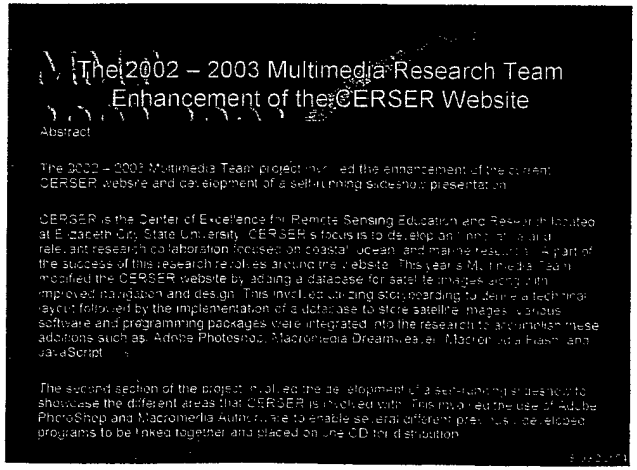
Jun. 2001-Present **Target, Matthews, NC**
Receptionist
- Responsible for the fitting room area
- Answer the telephones and make store announcements
- Schedule interviews and meetings for the Human Resource Manager

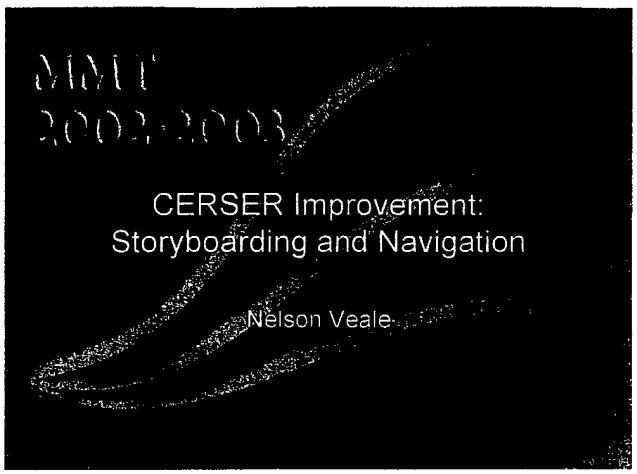
Jun. 2000-Dec. 2000 **Hardee's, Monroe, NC**
Cashier
- Operated the register
- Assisted guest
- Monitored the dining room area

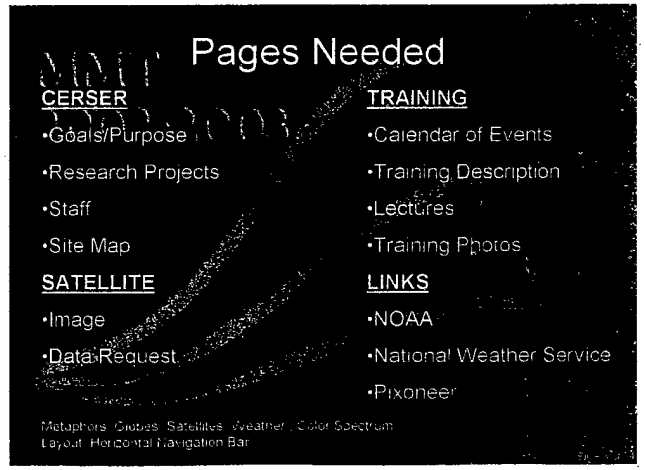
TECHNICAL SKILLS:
- Operate PC and Macintosh computers
- Fundamental Programming
- Use Access, Excel, Word, PowerPoint


Enhancement of
http://cerser.ecsu.edu and
Development of a Self-running
Capability Presentation.

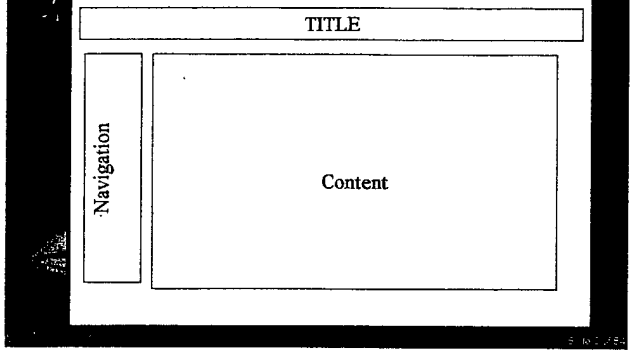

MMT
2002-2003


The 2002 – 2003 Multimedia Research Team
Enhancement of the CERSER Website
Abstract
The 2002 – 2003 Multimedia Team project involved the enhancement of the current CERSER website and development of a self-running slideshow presentation.
CERSER is the Center of Excellence for Remote Sensing Education and Research located at Elizabeth City State University. CERSER's focus is to develop an innovative, cultural relevant research collaboration focused on coastal, ocean, and marine resources. A part of the success of this research revolves around the website. This year's Multimedia Team modified the CERSER website by adding a database for satellite images along with improved navigation and design. This involved using storyboarding to define a technical layout followed by the implementation of a database to store satellite images. Various software and programming packages were integrated into the research to accomplish these additions such as: Adobe Photoshop, Macromedia Dreamweaver, Macromedia Flash, and JavaScript.
The second section of the project involved the development of a self-running slideshow to showcase the different areas that CERSER is involved with. This involved the use of Adobe PhotoShop and Macromedia Authorware to enable several different presentations developed programs to be linked together and placed on one CD for distribution.


MMT
2002-2003
CERSER Improvement:
Storyboarding and Navigation
Nelson Veale


Pages Needed
CERSER
•Goals/Purpose
•Research Projects
•Staff
•Site Map
SATELLITE
•Image
•Data Request
TRAINING
•Calendar of Events
•Training Description
•Lectures
•Training Photos
LINKS
•NOAA
•National Weather Service
•Pixoneer
Metaphors: Globes, Satellites, Weather, Color Spectrum
Layout: Horizontal Navigation Bar

Storyboard



Navigation

Why Pop-Up Menus

- Complex Navigation
- Simple Format
- Easier To Use

Creating a Pop-Up Menu

- Program: Fireworks
- Export to: Dreamweaver

Macromedia Fireworks

- Web graphics application
- Edit both vector and bitmap graphics
- Generates JavaScript to create pop-up menus

The Slice Tool

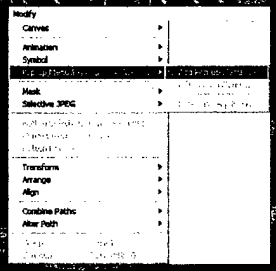
Slice Button

- Use the Slice Tool to highlight the text needed to create the pop-up menu

Slice Tool Options

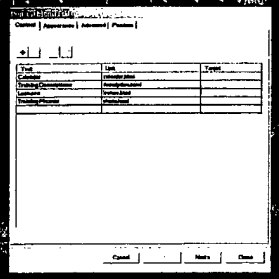
- Slice Tool (Rectangular)
- Slice Tool (Polygon)

Step 1: Creating Pop-Ups



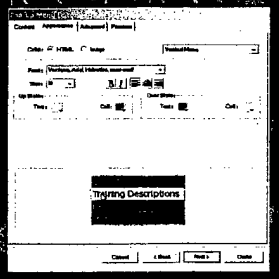
- Click on Modify in Fireworks
- Scroll Down To Pop-up Menu
- Select Add Pop-up Menu

Step 2: Content



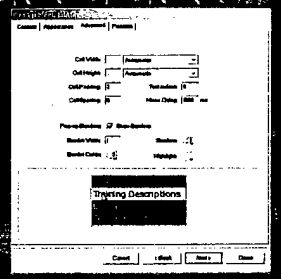
- Click on the Blank Line Under Text
- Create a name for your link
- Click on the Blank Line Under Links
- Type in the URL address

Step 3: Appearance



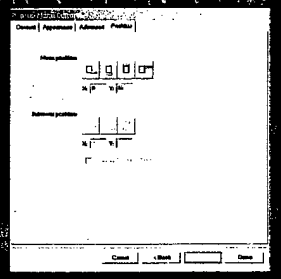
- Contains options that determine the appearance of each menu cell's Up state and Over state, as well as the menu's vertical and horizontal orientation
- The text color should be lighter than the cell color.

Step 4: Advanced



- Options that determine the cell dimensions, padding, and spacing.
- Cell border, width and color
- Menu delay
- Text indentation

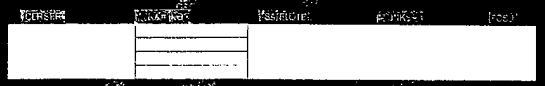
Step 5: Position



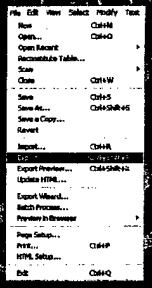
- Menu and submenu placement
- Submenu setting places the pop-up submenu to the right or lower right of the parent menu or below it
- Menu setting places the pop-up menu relative to the slice
- Preset positions include bottom, lower right, top, and upper right of a slice

The Pop-Up Menu

Final view in Fireworks

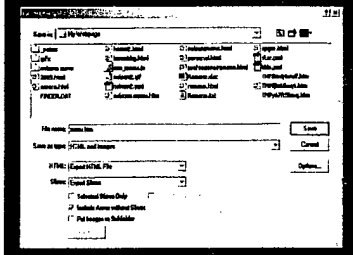


Step 6: Exporting To Dreamweaver



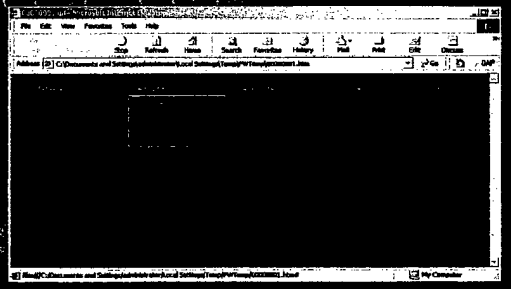
- Select "File"
- Then "Export"

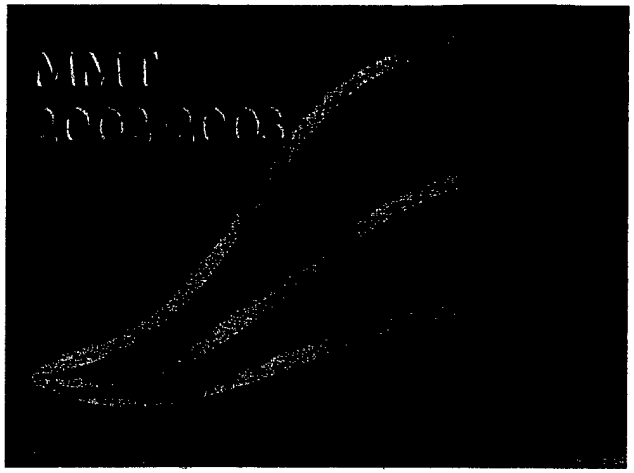
Step 7: Saving The Pop-Up Menu File

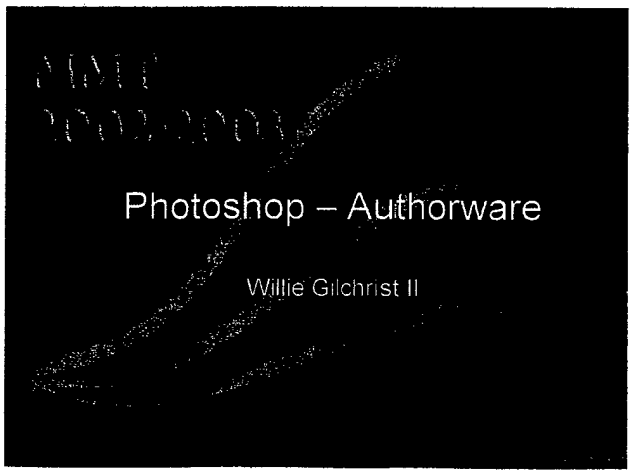


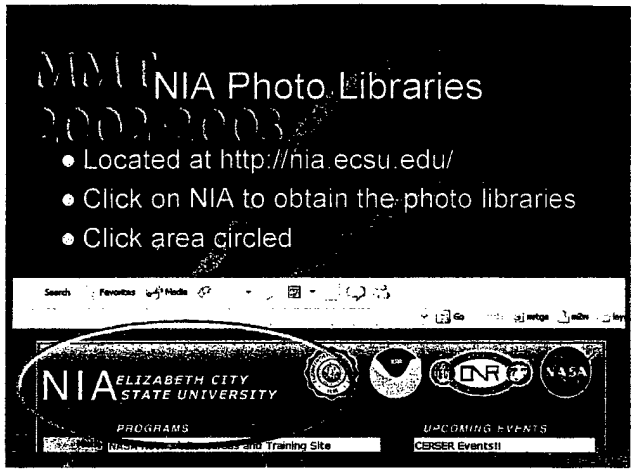
- Save the File as an HTML file

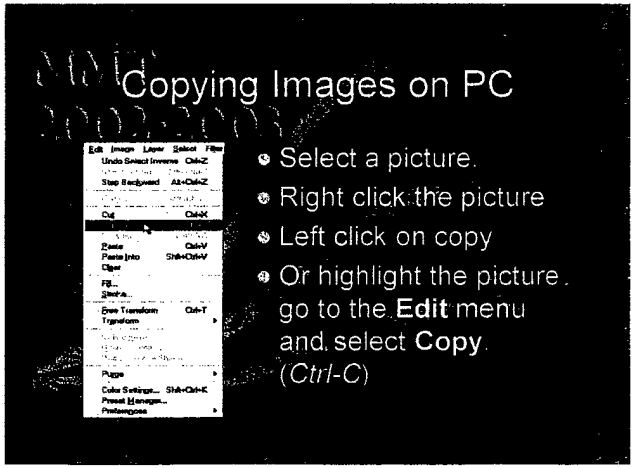
Finished Product: Pop-Up Menu in Browser






Photoshop – Authorware
Willie Gilchrist II


NIA Photo Libraries
Located at http://nia.ecsu.edu/
Click on NIA to obtain the photo libraries
Click area circled
NIA ELIZABETH CITY STATE UNIVERSITY
PROGRAMS
UPCOMING EVENTS
CERSER Events!!


Copying Images on PC
Select a picture.
Right click the picture
Left click on copy
Or highlight the picture, go to the Edit menu and select Copy. (Ctrl-C)

Copying Images on the Macintosh

- Hold down the mouse on a picture to see the submenu
- Select "Copy Image"

Photoshop Image Resizing

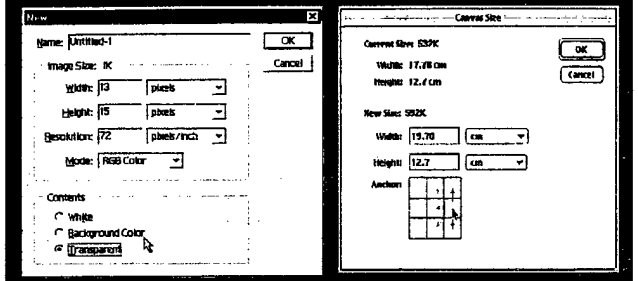
- **To Resize the image:** Go to Image>Image Size
- ***Note:*** Do not make the image any larger in size (dimensions) than needed.

  Large Dimensions = Large File Size

Image Resizing

New File Window PC

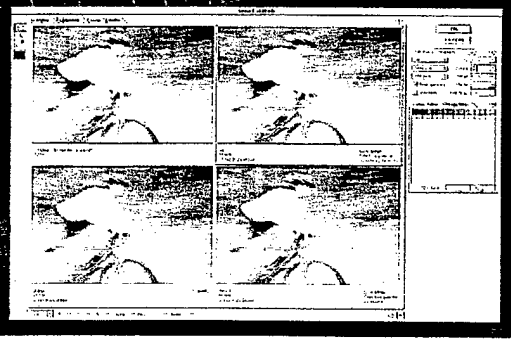
Image Size Window Mac



Photoshop Save for Web

- Menu bar: File > Save for Web
- Setting options, along with Color Table and Image Size tabs
- Select a format (GIF, JPEG, PNG-8, or PNG-24).

Save for web work area



Authorware

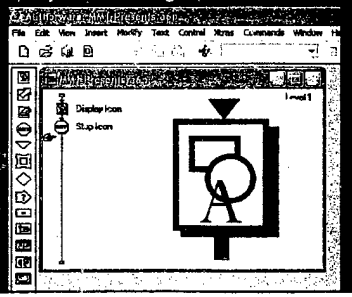
- Creates applications and web-based tutorials
- Simulations incorporating audio and video
- Drag-and-drop interface
- Templates and wizards
- Distributionvia the web. Local Area Networks or CD-ROM
- Track student results

Why Authorware

- Need to connect multiple software applications
- Versatility for interactivity and sound
- Quick development time

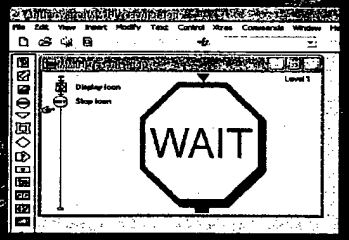
Display Icons

Displays text and graphics on the screen



Stop Icon

Adds pauses with or without onscreen buttons that let users decide when to continue.

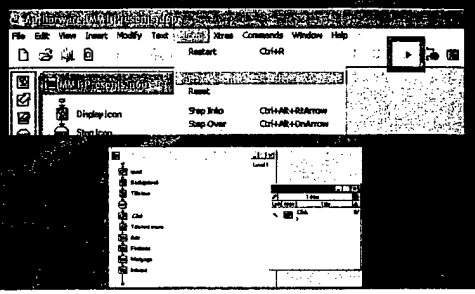


Alignment Panel

Choose Modify > Align to display the Alignment panel

Run

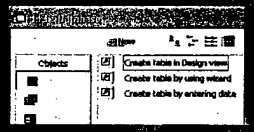
Executes the program from the beginning



Implementing a Database in HTML

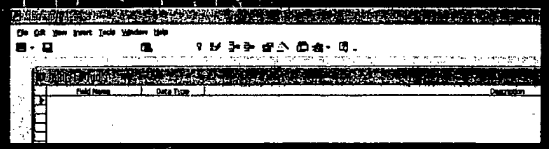
Shayla Brooks

Access – Starting a Table

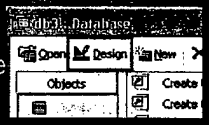


- This menu displays options for creating a table
  - Design View
  - Table Wizard
  - Data entry

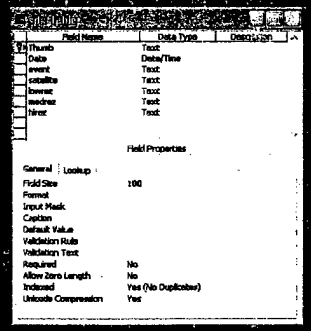
Create a Table in Design View

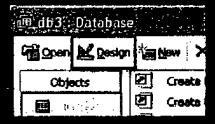


Allows field names, data types, field sizes, etc. to be set up quickly and easily



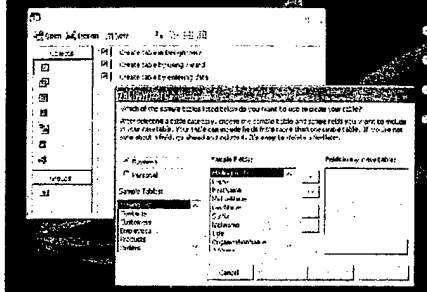
Access Table Design View





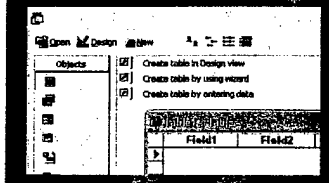
Access also displays the structure of an existing table in design view

Create Table Using the Wizard



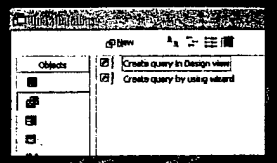
- Category
- Sample Tables
- Sample Fields
- Fields for new table

Create Table by Entering Data



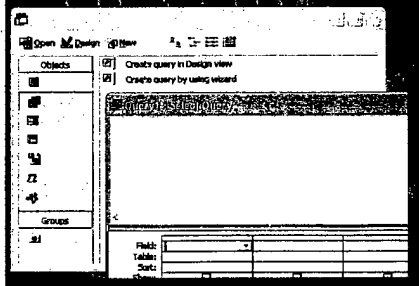
In datasheet view you can enter and edit records directly in the table

Starting a Query



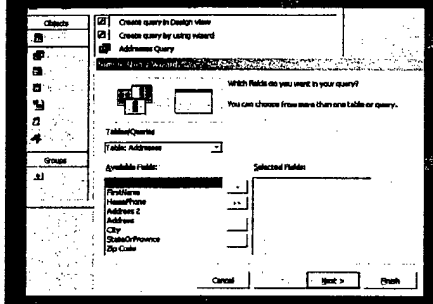
- Queries
  - Extract data subsets
  - Creates Recordsets
- Options for creating queries
  - Design View
  - Query Wizard

Access Query Design View



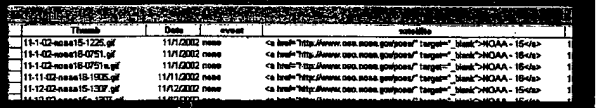
- Click the Design button
- Access will display the Select Query window

Access Query Wizard



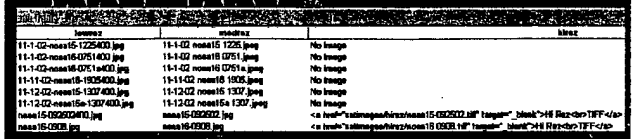
- Select which table to use
- Select which fields to display
- Name the query

Access Image Information



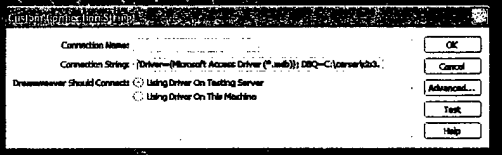
- The above image illustrates the fields of the CERSER image database including
  - Paths to the actual images
  - Thumb, Date, Event, Satellite

Access Image Link Data



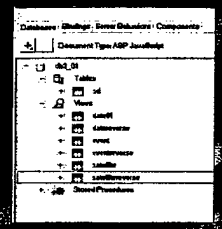
- The last fields of the database provide different viewing resolutions for the user
  - Lowrez – 400x341, 72 dpi
  - Medrez – 999x851, 72 dpi
  - Hirez – 999x851, no compression (TIFF or JPEG format)

Connection String



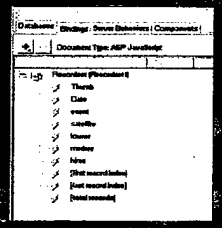
- Tells the application (Dreamweaver) what driver is being used to create the database
- Location of the Database

Dreamweaver Database Window



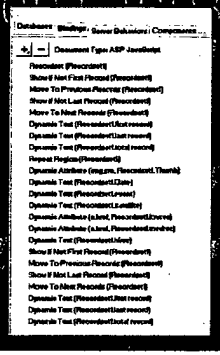
Specifies what tables and queries exist for your database

Server Bindings



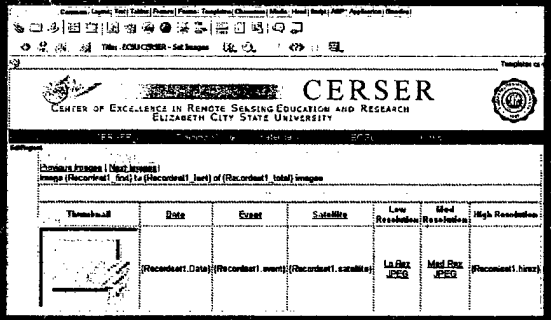
- What's connected on the screen
- What categories are in the database

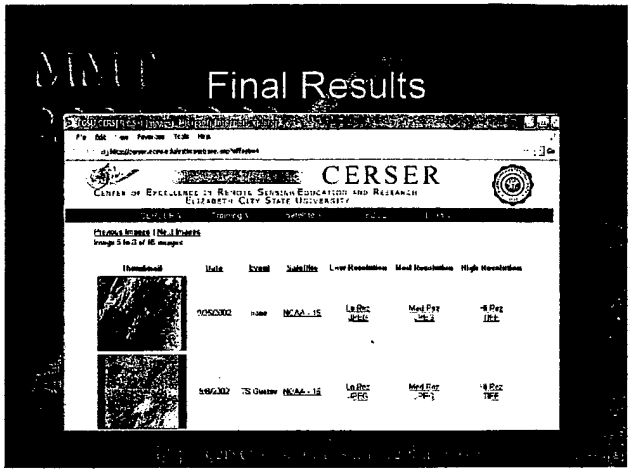
Server Behaviors

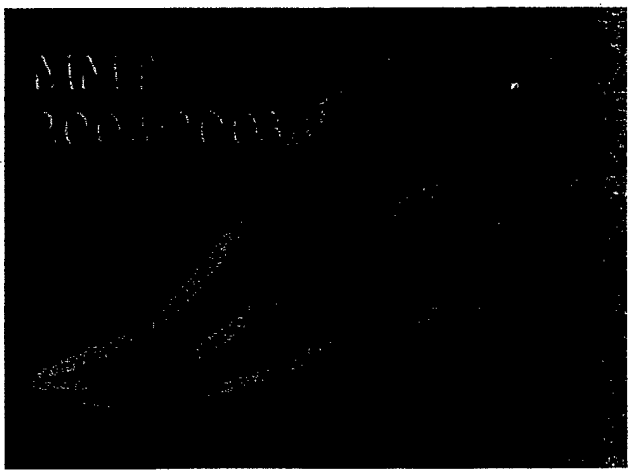


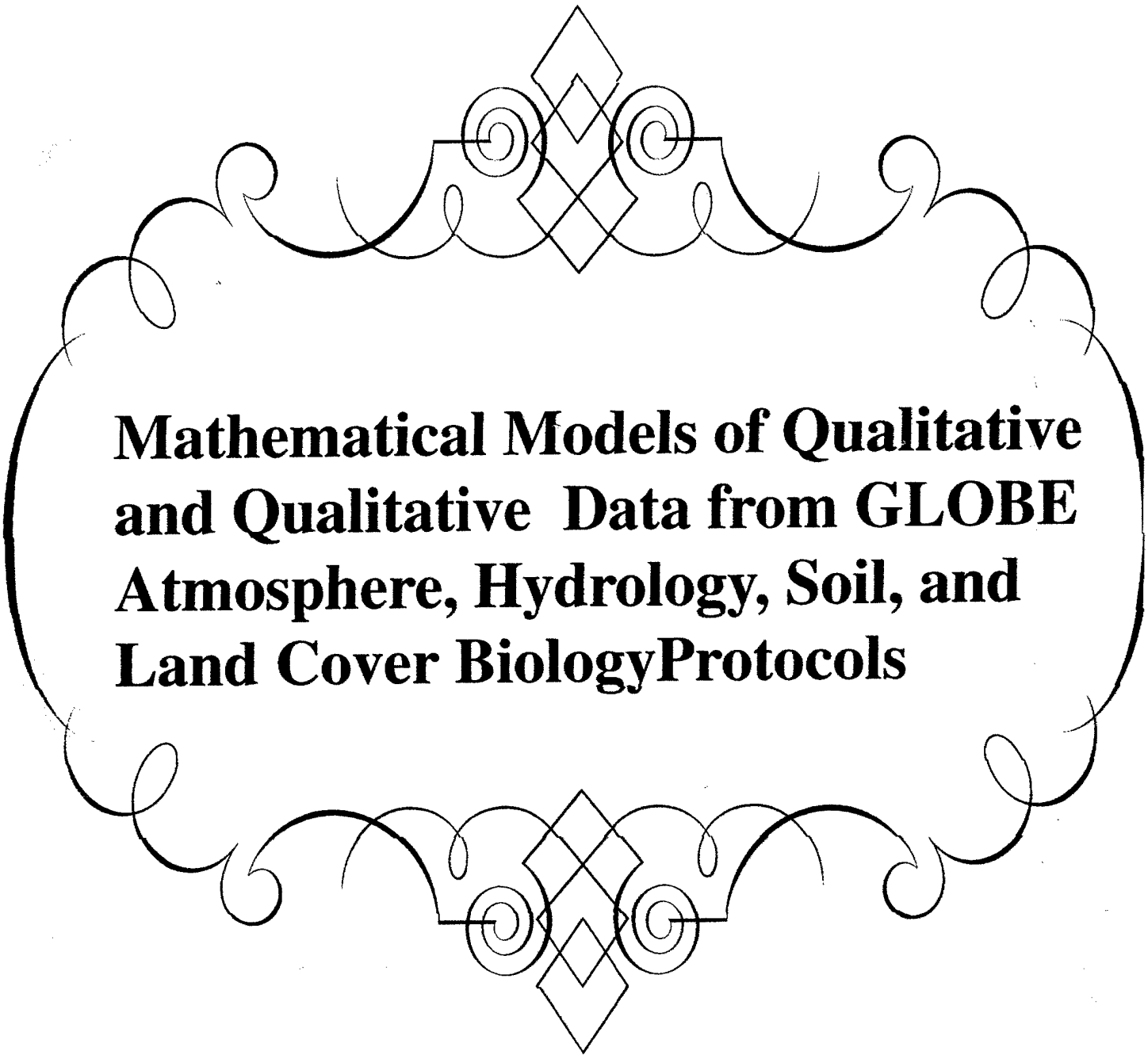
- For navigating and moving along the records
  - Repeat region
  - Move to next record
  - Move to previous record
  - Show if not first record
  - Show if not last record

View in Dreamweaver

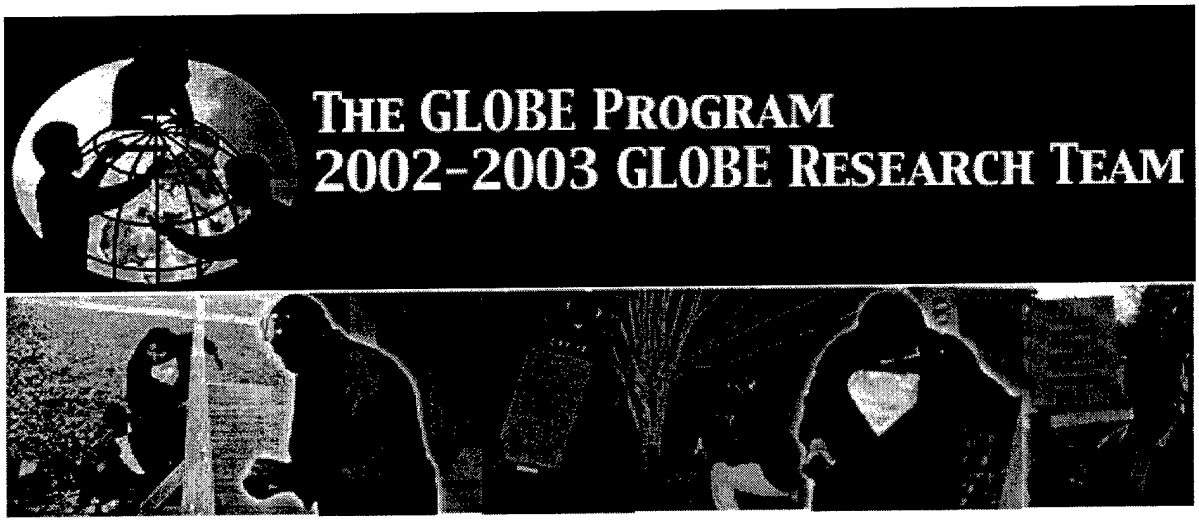



Final Results
CERSER





Mathematical Models of Qualitative and Qualitative Data from GLOBE Atmosphere, Hydrology, Soil, and Land Cover BiologyProtocols



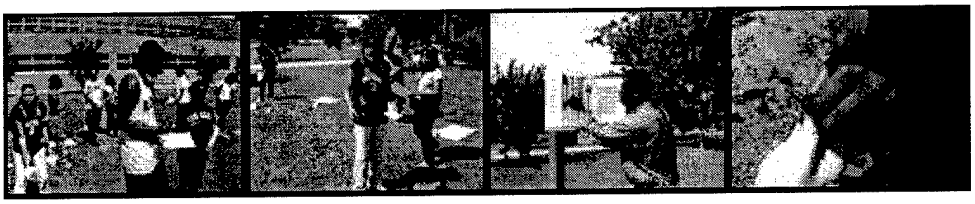
Home
Abstract
Team Members
Team Mentor
GLOBE Protocols

Related Links:
The GLOBE Website
NASA Website
NIA Website
ECSU Website

The 2002-2003 GLOBE Research Team

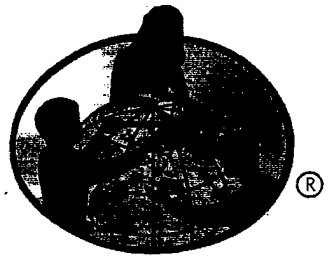
Welcome to website for the 2002-2003 GLOBE Program Research Team, housed in the Department of Math and Computer Science at Elizabeth City State University by the Office of Naval Research Scholarship Program. This site provides information about research being conducted during the 2002-2003 academic school year involving the following environmental protocols: atomspheric investigation, hydrology investigation, soil investigation, and land cover/biology investigation.

The goal of our research is to collect environmental data from three sites the research team have established on the campus of Elizabeth City State University, create mathematical models to represent our collected data, and design a report in both written and electronic form that highlights our collected data from a quanlatative and quantitative prospective.



In addition, the GLOBE Program Research team, under the mentorship of Ervin Howard, participate in GLOBE training workshops to educate pre-service and in-service teachers about the various GLOBE Protocols. Further, we also have established workshops to school age children where an array of experienments are performed from each of the GLOBE Protocols.

An Investigation of GLOBE Protocols



Presented by the 2002-2003 GLOBE Research Team
at Elizabeth City State University on April 8, 2003

Team Mentor:
Mr. Ervin Howard

Team Members:
Dana Brown, Shawneque Reid, and Carl Seward

Team Homepage:
http://nia.ecsu.edu/onr/02-03/research/globe/index.html

An Investigation into GLOBE Protocols

Contact Information Sheet

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Team Member:	**Carl W. Seward** Junior Mathematics Major – Dept. of Math and Computer Science Elizabeth City State University
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Webpage:	http://nia.ecsu.edu/sp/0203/cseward2002/home.html

Abstract:

The 2002-2003 GLOBE Research Team at Elizabeth City State University during the academic year established and monitored three environmental sites on the campus of Elizabeth City State University. The purpose of the establishment and the monitoring of these sites were to collect data that was analyzed using various graphing methods. These methods include: line graphs, stem-and-leaf graphical displays, and box-and-whicker graphical displays. These methods allowed the researches to show the frequency and distribution of data values. From our findings, we were able to produce a report that reflects the qualitative and quantitative information gathered during the research period.

Specifically, the environmental sites established investigated targeted ecological concentrations that have been identified as Global Learning and Observations to Benefit the Environment (GLOBE) protocols. There protocols are: atmospheric investigation, hydrology investigation, and soil investigation. In addition to collecting and analyzing data, the researchers conducted field experiments to further understand a particular GLOBE protocol.

Each protocol requires that specific information be extracted from the respective environmental site. For atmospheric investigations, we recorded air temperature, minimum temperature, and maximum temperature from an instrument shelter, which is considered the environmental site. With hydrology investigations, the researchers collected water temperatures from a creek located on the campus of Elizabeth City State University to evaluate the water temperature, in addition to performing water analysis testing. Finally, soil investigations consisted of measuring soil temperatures.

Further, through the consorted efforts of the researchers, all of whom are mathematics majors with an interest in education, the student researchers learned how to turn scientific information into a lesson that can be learned by secondary and undergraduate mathematics/mathematics education students, by way of expressing data in a graphical context.

1. Introduction

GLOBE, or Global Learning and Observations to Benefit the Environment, is a hands-on international environmental science and educational program. Through the GLOBE program, teachers, students, and scientist communicate with each other in a consorted effort to learn more about the environment that we live by using data and observations collected by students.

There are three primary goals of the GLOBE program as a whole. The first goal is to enhance the environmental awareness of individuals throughout the world; to contribute to the scientific understanding of the Earth; and to help students reach higher levels of achievement in science and in mathematics.

With the GLOBE program, students from five years of age, to high school and college students conduct a continuing program of scientifically meaningful environmental measurements. Students at some schools that support this program have their reading transmitted to a central data processing facility via the internet, and collaborate with scientists and other GLOBE students in using the data for education and research.

Further, the measurements taken by the GLOBE students serve two important purposes. The first purpose is that scientists actually use the data acquired by students in their research programs and to improve our understanding of the global environment. The second purpose is that students get not only get to learn how to conduct a scientifically rigorous program of Earth observations, but also learn to use their own measurements, together with data from other resources, as a key part of their study of environmental science.

In our research, we focused on three of the GLOBE protocols. These protocols are: soil investigation, atmospheric investigation, and hydrology investigation. We carried these investigations out though the establishment of three environmental sites on the campus of Elizabeth City State University. The purpose of the establishment and the monitoring of the sites were to collect data that was analyzed using various graphing methods. These methods include: dot plot graphical displays, stem-and-leaf graphical displays, and box-and-whicker graphical displays to show frequency and distribution of data values. From our findings, we were able to produce a report that reflects the qualitative and quantitative information gathered during the research period.

2. Soil Investigation

2.1 Soil

Soils are a thin layer, called the pedosphere, on top of most of Earth's land surfaces. This thin layer is a precious natural resource. Soils so deeply affect every other part of the ecosystem that they are often called the great integrator. Soils hold nutrients and water

for plants and animals. Water is filtered and cleansed as it flows through soils. Soils affect the chemistry of the water and the amount of water that returns to the atmosphere to form rain. The foods we eat and most of the materials we use for paper, buildings, and clothing are dependent on soils. Understanding soil is important for knowing where to build our houses, roads, buildings, and playgrounds as well.

2.2 Characteristics of Soil

Soil is a mixture of rotting plants, animals, rock, and minerals from the bedrock below; however, it is composed of three main ingredients: minerals of different sizes; organic materials from the remains of dead plants and animals; and open space that can be filled with water and air. A good soil for growing most plants should have about 45% minerals (with a mixture of sand, silt and clay), 5% organic matter, 25% air, and 25% water. The gaps between the decaying materials are filled with air and water along the vast numbers of bacteria fungi and tiny plants. Soil is more prevalent in regions of high moisture and high temperatures than in cold, dry regions as the increased moisture contributes to erosion and increased temperature contributes to a more rapid breakdown of organic material. When organic material breaks down, it forms a soil that is rich in their elements. This soil is called "humus" - a dark tarry substance that is very fertile for plant growth. Humus is a jellylike substance that is composed of decaying organic material. It is vital to soil fertility.

One of the most important characteristics of any soil is how much water it contains. Either in the form of a vapor or a liquid, water occupies about one-fourth of the volume of a productive soil. If the soil gets too dry, and is not covered by vegetation, it blows away in the wind. Yet if there is too much water, the ground becomes soggy and cannot sustain many crops or, for that matter, the foundations of buildings. The rate at which water flows into or infiltrates the surface determines how much water will runoff during a rainstorm. Dry, porous soils can absorb large amounts of rain and protect us from flash floods. Soil that is nearly saturated with water or slow to take up water can heighten the likelihood of flooding.

2.3 Soil Temperature

Soil temperature changes more slowly than that of the atmosphere. In many temperate regions the surface soil freezes in winter, but below a certain depth, the ground never freezes and the temperature is almost constant throughout the year. The temperature and moisture of the soil near the surface affect the atmosphere as heat and water vapor are exchanged between the land surface and the air. These affects are smaller than those of oceans, seas, and large lakes, but at times they significantly influence the weather. Soil temperature acts much the same way to influence all living organisms.

Both the temperature and moisture of the soil near the surface affect the atmosphere as heat and water vapor are exchanged between the land surface and the air. These affects are smaller than those of oceans, seas, and large lakes, but at times they significantly influence the weather. Hurricanes have been found to intensify instead of losing strength when they pass over ground that is already saturated with water.

Meteorologists have found that their forecasts are sometimes improved if they factor soil conditions into their calculations. How surface soil temperature and moisture respond to changes in the atmosphere depends upon the characteristics of the surface of the soil and those of the underlying soil profile.

(Picture of Soil Thermomter)

3. Atmospheric Investigation

3.1 Atmosphere: The Big Picture and Its Importance

What is the atmosphere, why is it important for scientists and students to conduct investigations into the atmosphere, and how does GLOBE tie into all of this? Further, how can we use the data from the scientific investigations from GLOBE to produce mathematical analysis that school-age children can understand? These four very interesting questions are what we will address our research of atmospheric investigations for the GLOBLE research project at Elizabeth City State University.

To answer our first question, Earth's atmosphere is a thin layer of gases composed of about 78% nitrogen, 21% oxygen, and 1% other gases, where these gases are argon, water vapor, carbon dioxide, and ozone. In addition, there are also solid and liquid particles called aerosols suspended in this layer of gases. The atmosphere is also held to the planet by gravity (or the gravitational force) with the result that atmospheric pressure and density decreases with height about Earth's surface.

The next question we want to answer is why is it important for scientists and students to study and conduct investigations into the atmosphere? It is important to understand and conduct investigations into the atmosphere because of the many things to which the atmosphere makes contributions. We as human beings live on land, however we live, move, and breathe in the atmosphere. The atmosphere gives us oxygen we breathe and carries off the carbon dioxide we exhale. The atmosphere is responsible for filtering out most harmful forms of sunlight and traps outgoing heat from the Earth's surface. The atmosphere is also responsible for transporting energy from the equator to the poles, making the whole planet more liveable. Additionally, the atmosphere brings the moisture evaporated from lakes and oceans to dry lands so that we have water to drink and to sustain our agriculture. So indeed, this thin layer that surrounds us is endowed with great responsibility, and we as curious people want to know more about how the atmosphere effects our environment.

This leads us to point why both scientists and students are working together through the GLOBE program to study and conduct these important investigations into the atmosphere. It is often implied that scientists know what is happening in all parts of the world, but this is far from true. There are many regions where scientists have only the most generalized information and understanding of environmental factors such as air temperature and precipitation. Even in regions where there seems to be an abundance of

data, scientists still do not know for example how much precipitation and temperature vary over relatively short distances. Is the differences of precipitation and temperature great over relatively short distances, or is the diference nominal? Without investigations conducted by students and scientists, we simply just would not know! It is true that official weather monitoring stations, such as the National Weather Service stations in Morehead City, North Carolina and Wakefield, Virginia, have contributed a tremendous amount of data for a century or more in some locations, while at the same time, satellite technology, such as GPS or Global Positioning Satellite devices, has given us pictures of large areas every 30 minutes, and global images at least twice daily for at least a decade. However, despite all of these wonderful efforts, there are still gaps in coverage. Further, the atmosphere varies significantly within these gaps, and that is how GLOBE engages students in environmental studies such as atmospheric investigations, from even as early as elementary school, to college students at Elizabeth City State University! Additionally, scientists who study weather, climate, phenology, ecology, biology, hydrology, and soil study these readings taken.

3.2 Weather and Climate

Before moving forward, when talking about the atmosphere, most people think about weather and climate, but it is important to make clear or refresh the distinction between weather and climate. Many persons feel that both weather and climate are synonymous, but this is not true. By weather, we mean what is happening in the atmosphere today, tomorrow, or even next week. On a day-to-day basis, we want to know many things about the weather we will encounter. For example, we may want to know the air temperature and whether it will rain so we can decide what type of clothes we will wear for the day; whether we will need to take an umbrella with us outside, or if we need to put on sunscreen to protect ourselves from the sun's ultraviolet rays on a sunny day. All of these things fall within the realm of what we call weather.

By climate, we mean weather averages, variability, and extremes over time. Persons also want information about the atmosphere on a long-term basis. For example, farmers need to know if their crops will get enough rain during a planting season. Ski resorts need to know if enough snow will fall. Even insurance companies are interested in the atmosphere on a long-term basis; insurance underwriters for areas struck by hurricanes would like to know how many hurricanes to expect in a given year and how strong they will be when they make landfall. In fact, many people are interested in what will the weather be like not only today, but also next week, next month, next year, and even in ten years. All of these things fall within the realm of what we call climate.

3.3 Measuring Maximum, Minimum, and Current Temperature

In our research with respect to the atmospheric investigation, we decided to study maximum, minimum, and current air temperature. These measurements were taken from an instrument shelter that was previously established on the campus of Elizabeth City State University by a GLOBE research team during the summer of 2002. The objective of this investigation was to measure maximum and minimum air temperature, and also

the current air temperature during a certain time every day. From this investigation, we learned how to read the maximum, minimum, and current air temperatures using a U-shaped thermometer, and understand the diurnal temperature variations.

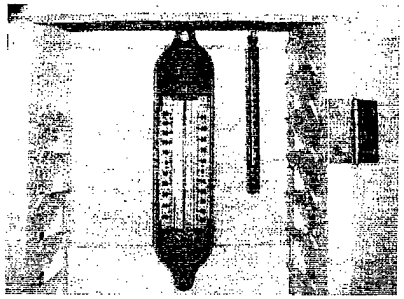
We have already discussed before how important the atmosphere is to Earth, but how does maximum, minimum, and current temperatures factor into the atmosphere with respect to weather and climate? In regards to weather, have you ever noticed that the daily weather forecasts are not always correct? This is partly because scientists are still trying to learn more about how our atmosphere works. Measurements of air temperature, are important to help scientists better understand our atmosphere from day to day. This understanding will enable meteorologists and others to accurately predict the weather for the next day, or even the next seven days! These measurements are also important in understanding precipitation; whether precipitation falls as rain, sleet, snow, or freezing rain depends on the air temperature.

When we are talking about climate, questions can be asked like, "Is this an unusually warm year?" or "Is Earth getting warmer as some scientists have predicted?" To answer these and other questions about Earth's climate, measurements are needed of daily maximum and minimum air temperature, month by month, year by year. This data is used to formulate longitudinal studies of the Earth's climate

In addition to weather and climate however, we also know that many of the chemical reactions that take place between trace gases in the atmosphere are affected by temperature. For example, in several of the reactions involved in the formation of ozone, the rate of reaction depends on temperature. Further, the presence of water vapor, water droplets, and ice crystals also plays a role in the chemistry of the atmosphere, all of these relating back to temperatures.

3.4 Method of Acquiring Atmospheric Data

To acquire our data, we used a liquid-filed thermometer, which we placed in the instrument shelter on the campus of Elizabeth City State University. The liquid-filled maximum and minimum thermometer is a U-shaped tube with two indicators the current air temperature and shows the maximum and minimum temperatures that have occurred for a particular day.



On the maximum side, the temperature scale is such that temperature increases as you go from bottom to top, as is true with regular household thermometers many persons have in their homes. On the minimum side however, the scale shows temperature decreasing as you go from bottom to top. Most of the liquid in the thermometer is in the bulb, which is at the top of the minimum side. As the temperature increases, the expansion of the liquid in the bulb pushes the mercury down on the minimum side and up on the maximum side. The indicator at the top of the mercury column on the maximum side of the thermometer is pushed upward. When the temperature drops, the column of mercury moves in the opposite direction, but the indicator on the maximum side remains in place, indicating the highest temperature reached. As the temperature decreases, the mercury column rises on the minimum side of the thermometer until it reaches the indicator pin on the minimum side. Then, if the temperature continues to decrease, it pushes this indicator upward. When the temperature again increases, the indicator on the minimum side remains in place to indicate the lowest temperature reached.

3.5 Methods of Expressing Data (Data Analysis)

3.5.1 Producing Mathematical Analysis

To conclude our research with respect to atmospheric investigations, we ask the question, "How can we use data from these scientific investigations to produce mathematical analysis for school-age children?" The National Council of Teachers of Mathematics (NCTM) Principles and Standards for School Mathematics (2000) indicate that the elementary school curriculum from pre-kindergarten through grade 8 should include the study of data analysis so that students can formulate questions that can be addressed with data and collect, organize, and display relevant data to answer these questions. In this research, we used three relatively simple methods to display our data quantitatively in a way that students could gain information. These methods, all types of graphs, include: stem-and-leaf plots, and box-and-whisker (all of these are familiar to persons not in elementary or middles grades education as statistical graphs).

3.5.2 Stem-and-Leaf Plots

Another common form of data display is the stem-and-leaf plot. This is very similar to the dot plot because it shows the actual data values, but it is usually shown in a vertical rather than horizontal format, more like a frequency chart.

To make a stem-and-leaf plot, we being by locating the extremes in the data set and finding the range for the data. Then we separate each data value into its tens digit and its unit digit. The tens digit serves as the stem and the unit digits serves as the leaf. The stems are written to the left of a vertical line in either descending or ascending order. Each of these stems has several leaves, or related units, associated with it. Filling then in with the appropriate stem to the right of the vertical bar results in an unordered stem-and-leaf plot. If the leaves for a stem are ordered from smallest to largest, the resulting display is called an ordered stem-and-leaf plot. It is also interesting to note that an ordered stem-and-leaf plot makes it easy to identify numbers that occur several times. Below, we display a stem-and-leaf plot for the six data sets we have presented earlier, representative of the data we collected over the year.

Stem-and-Leaf of Current Air Temperature for Fall 2002

0	924
1	797465657990752974900
2	128124261

Stem-and-Leaf of Minimum Air Temperature for Fall 2002

0	-5-6-1000000001112345555669999
1	2224557

Stem-and-Leaf of Maximum Air Temperature for Fall 2002

1	1366678899
2	00000011122344455677
3	67

Stem-and-Leaf of Current Air Temperature for Winter 2003

0	33444444444444455555556667
1	55667777888899
2	0

Stem-and-Leaf of Minimum Air Temperature for Winter 2003

0	66
1	22222233333333333334444444444444444556

Stem-and-Leaf Maximum Air Temperature for Winter 2003

0	166

1	5556666677788
2	011111111111111111222566

Stem-and-Leaf of Current Air Temperature for Spring 2003

0	67
1	77788888999
2	0

Stem-and-Leaf of Minimum Air Temperature for Spring 2003

1	33344444444557

Stem-and-Leaf of Maximum Air Temperature for Spring 2003

1	566
2	112455666677

3.5.3 Box-and-Whisker Plot

A box-and-whisker plot is a graphic presentation of data using five measures: the median, the first quartile, the third quartile, and the smallest and largest values in the data set between the lower and the upper inner fences. This type of plot can help visualize the center, the spread, and the skewness of a data set. It also helps detect outliers.

To make a box-and-whisker plot, we first rank the data in increasing order and calculate the values of the median, the first quartile, the third quartile, and the interquartile.range. To find the median, take the middle value and divide by two (2). If you have an even set of values, take the center two values, add, then divide by two (2). To find the first quartile, divide the set into two even groups, and take the middle term of each group, and divide by (2). If you set of data is even, then take the middle two values, add, and divide by two (2). The interquartile range is found by subtracting the first quartile from the third quartile.

Next, we have to find the points that are 1.5 X IQR below Q1 and 1.5 X IQR above Q3. These two points will, respectively, produce the lower and upper inner fences. Then we will determine the smallest and the largest values in the given data set within the two inner fences. Following that, we draw a horizontal line and make the scale of the line such that it represents all of our values in the data set. Above the horizontal line, draw a box with its left side at the position of the first quartile and the right side at the position of the third quartile. Inside of this box, draw a vertical line at the position of the median.

The next, and final step of drawing a box-and-whisker plot is to draw two lines, joining the points of the smallest and the largest values within the two inner fences to the box. The two lines that join the box to these two values are called whiskers. A value that falls outside the two inner fences is shown by an asterisk and is called an outlier. Below, we

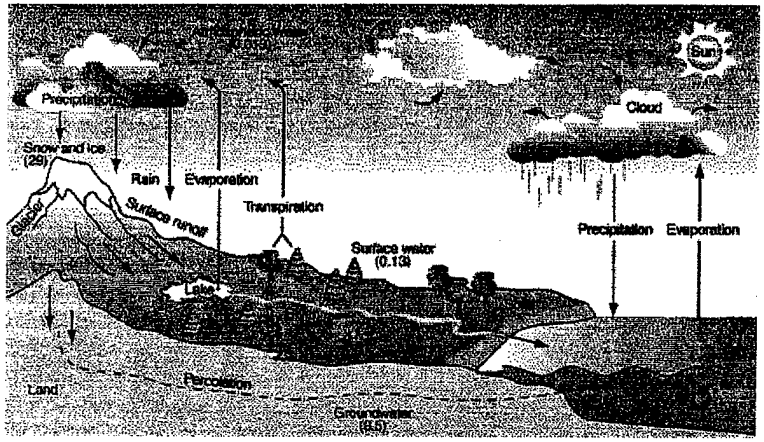
have displayed the current air temperature box-and-whisker plots for each semester sample data.

4. Hydrology Investigation

4.1 Hydrology: A Deeper Lo ok At Water

The Global Learning and Observations to Benefit the Environment (GLOBE) Program is a worldwide hands-on, primary and secondary school-based education and science program. It trains teachers to help students improve their achievement in science and math. GLOBE gives students experience in the use of computer and network technology and improves student understanding of science because it involves them in performing real science - taking measurements, analyzing data, and participating in research in collaboration with scientists. GLOBE does this by investigating four protocols in the environment. One of these protocols is Hydrology. But what is Hydrology? Why should scientist and students conduct investigations to study this protocol? Also, how can a mathematical analysis of the investigation be produced?

Hydrology is the science that treats the waters of the earth, their occurrence, circulation and distribution, their chemical and physical properties, and their reaction with the environment including their relation to living things. The study of hydrology is also concerned with the ways in which water is stored and transferred over, on, and under the Earth's surface. This study is also known as the hydrologic process or water cycle. In this cycle, water from the Earth evaporates due to the sun's heat. As the water is evaporated, it is cooled in the air. This forms clouds. When the water vapor in the air gets too heavy, it returns to the earth as precipitation and the process begins again. This process is what greatly affects our weather. It gives us precipitation, humidity, and cloud cover just to name a few things. In the Hydrology investigation, GLOBE investigates water in its liquid form.



In it's liquid form water makes up about seventy percent of the Earth's surface. Although most of the Earth is water, not all of this water is consumable. Water has to go through many chemical reactions to be purified and safe enough for drinking. This is because it's hard to find pure water on Earth that is safe for consumption and the water left carries many natural and human-introduced impurities. These impurities become dissolved or suspended in water and this is what affects the quality of the water. This is why scientist and students conduct investigations on water. Testing water helps scientist and students to develop a better understanding of our local land and water resources. This knowledge can help them make more intelligent decisions about how themselves and others use, manage, and enjoy these resources. Also, by testing water they can assess the extent to which human activities are affecting the quality of water, thus affecting how people will be able to use it in the future.

4.2 Indicators in a Hydrology Investigation

When conducting a Hydrology Investigation, GLOBE measures several key indicators of water quality. They are transparency, water temperature, dissolved oxygen, pH, electrical conductivity, salinity, alkalinity, and nitrate. Each is listed below and brief description follows telling what it is and why it is important for someone conducting a Hydrology investigation to know.

4.2.1 Transparency

This indicator deals with the clarity of water. It is the degree to which light penetrates into water. This is important because the less turbid water is the easier light can pass

through. This light helps in the growth of plant life and also affects the temperature of water. Transparency is measured with a Secchi disk or tubidity tube. Most natural waters have a transparency ranging from 1 meter to a few meters whereas water around coral reefs can have a transparency of up to 30 – 40 meters.

4.2.2 Dissolved Oxygen

This indicator is a natural impurity in water. Dissolved oxygen analysis measures the amount of gaseous oxygen (O_2) dissolved in an aqueous solution. Oxygen gets into water by diffusion from the surrounding air, by aeration (rapid movement), and as a waste product of photosynthesis. Oxygen is a necessary element to all forms of life. A good level of dissolved oxygen is essential for aquatic life. Total dissolved gas concentrations in water should not exceed 110 percent. Concentrations above this level can be harmful to aquatic life. Fish in waters containing excessive dissolved gases may suffer from "gas bubble disease", however, this is a very rare occurrence. Adequate dissolved oxygen is necessary for good water quality. As dissolved oxygen levels in water drop below 5.0 mg/l, aquatic life is put under stress. The lower the concentration of dissolved oxygen, the greater the stress. Oxygen levels that remain below 1-2 mg/l for a few hours can result in large fish kills.

4.2.3 pH

pH is a measure of the acidic or basic nature of a solution. The pH of water influences most of its chemical processes. Pure water (has no impurities and no contact with air) has a pH of 7. Water with impurities that does have a pH of 7 has an equal balance of acid and base. The pH of water has a strong influence on what can live in it. A pH range of 6.0 to 9.0 appears to provide protection for the life of freshwater fish and bottom dwelling invertebrates.

4.2.4 Electrical Conductivity

Electrical conductivity estimates the amount of total dissolved salts, or the total amount of dissolved ions in the water. It is how well water passes electrical current. The more impurities in the water the greater its electrical conductivity because the impurities increase the total amount of dissolved ions in the water. Safe levels of electrical conductivity would be at 1500-1800 microSiemens/cm. Levels above these reading could damage sensitive crops. In homes, readings below 750 microSiemens/cm would be considered safe.

4.2.5 Salinity

Salinity is a measure of the salt content in water and it is measured in part per thousand (ppt). The average salinity of Earth's oceans is 35 ppt. Salt content affects the types of organism found there. Thus, fresh waters and saline waters are inhabited by different types of organisms.

4.2.6 Alkalinity

This indicator is the measure of water's resistance to the lowering of pH when acids are added to the water. If alkalinity gets to low, an influx of acids coming into the water from a big rainfall or snowmelt could consume all the alkalinity and thus drop the pH. This could cause stress or harm to aquatic life in the water

4.2.7 Nitrate

It is the most highly oxidized form and usually the most abundant form of combined inorganic nitrogen in water. If there is an excess of nitrate, algae and plants life increases. This can adversely affect aquatic life and also affect the taste and odor of drinking water. Most natural waters have nitrate levels of 1mg/L nitrate nitrogen, but can be found in concentrations as high as 10mg/L nitrate nitrogen in some areas.

4.2.8 Water Temperature

This indicator is determined by the amount of solar energy absorbed by the water and the surrounding soil and air. We measure water temperature to understand the patterns of change over the year because the temperature of a body of water strongly influences the diversity of its aquatic life. High water temperatures stress aquatic ecosystems by reducing the ability of water to hold essential dissolved gasses like oxygen.

During the GLOBE team's hydrology investigation, the main indicator studied was water temperature. The data that was collected by water temperature was used to create the mathematical analysis that was produced by the 2002-2003 GLOBE team.

4.3 Acquiring the Data

In getting the data needed GLOBE has guidelines that those conducting the investigation should adhere to. By following these guidelines, errors in the data are reduced and a constant is set for all those who participate in the program. The collection of water temperature has a three part guideline. This guideline consists of selecting a site, calibration of the measurement instrument, and the process by which to measure water temperature.

4.3.1 The Site

The site the GLOBE team chose in recording water temperature was the creek adjacent to Griffin Hall on the campus of ECSU. This was a model site because it had seldom disturbance from outside life and it was convenient for all the students on the team to access.

4.3.2 Calibration

To record water temperature a standard thermometer is used. This thermometer is filled with liquid mercury and has an indicator that measures in degrees Celsius. To calibrate this instrument the thermometer is placed in ice water and remains there until it reads 0 degrees Celsius. When this temperature is reached, it lets one know that the thermometer is working correctly and it is ready for use. Calibration should be done prior to the first use of the instrument and every 3 months to maintain accuracy of recordings.

4.3.3 How to Measure Water Temperature

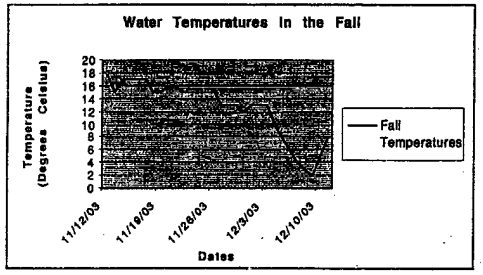
1. Tie one end of a piece of string securely to the end of the thermometer and the other end to a rubber band. Slip the rubber band around the wrist so that the thermometer is not lost if it is accidentally dropped in the water.
2. Hold the end of the thermometer (opposite the bulb) and shake it several times to remove any air in the enclosed liquid. Note the temperature reading.
3. Immerse the thermometer to a depth of 10 cm in the sample water for three to five minutes.
4. Raise the thermometer only as much as is necessary to read the temperature. Quickly note the temperature reading. If the air temperature is significantly different from the water temperature or it is a windy day, the thermometer reading may change rapidly after it is removed from the water; try to take the reading while the bulb of the thermometer is still in the water. Lower the thermometer for another minute or until it stabilizes. Read it again. If the temperature is unchanged, proceed to Step 5.
5. Record this temperature along with the date and time on the Hydrology Investigation Data Work Sheet.
6. Take the average of the temperatures measured by the student groups. If all measured values are within 1.0o C of the average, submit the average value to the GLOBE Student Data Server. Otherwise, repeat

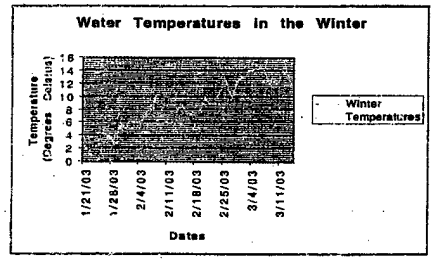
4.4 Data Analysis of the Hydrology Protocol

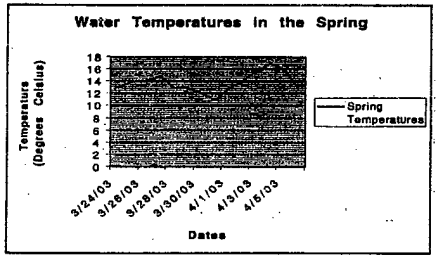
GLOBE highly encourages students to utilize GLOBE data to help answer questions about how the environment around them works. Through investigation projects, students do science that helps them to learn the importance of creating hypotheses, analyze data, draw conclusions, and report their results. During the GLOBE team's investigation, data on water temperature was collected over several months. From this data one can see how water temperature varies from week to week, month to month, or season to season. Utilizing Microsoft Excel, graphs showing this information were produced. By looking at these graphs, students can formulate questions about water temperature or they can look to these graphs and answer questions about water temperature. This process fulfills

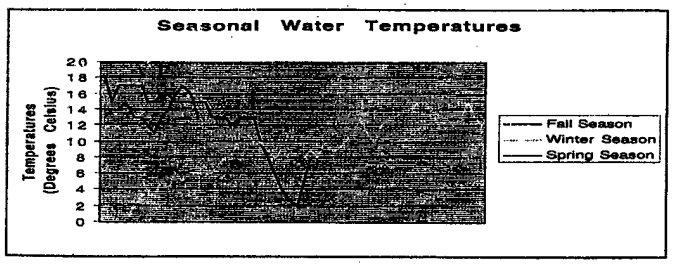
one of the Principles and Standards for School Mathematics (2000) as given by The National Council of Teachers of Mathematics (NCTM) for children Pre-K to 8th grade. The following are graphs produced by the investigation done by the GLOBE team on water temperature.

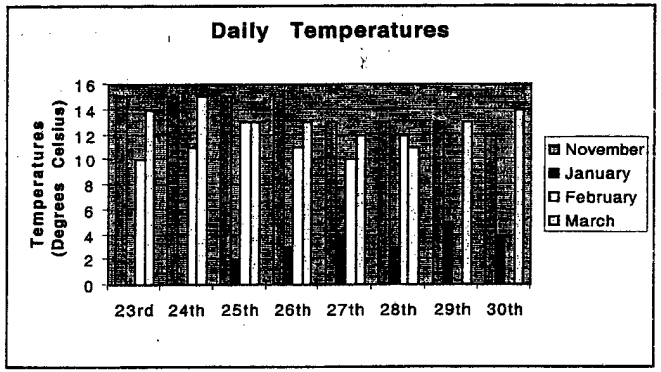
A line-graph shows trends in data at equal intervals. We have presented four graphs show the separate seasonal temperatures and the last graph is a combination.











The diagram above is a multi-bar graph. A bar graph illustrates comparisons among items. A multi-bar-graph uses multiple data series, producing separate bars at each interval. The previous bar graph shows the water temperature on the same day of different months. The month of December is not included because the university was closed during this time and no data was collected.

NOVEMBER

1	2333555555556677778
0	*

DECEMBER

1	0333
0	2345688

JANUARY

1	*
0	001222334455

FEBRUARY

1	00000111123
0	66667788888899999

MARCH

1	1222233333333444445555
0	*

APRIL

1	334667
0	*

A stem and leaf diagram provides a visual summary of data. This diagram provides a partial sorting of the data and allows you to detect the distributional pattern of it as well. The stem and leaf charts that are shown above show the distributional pattern, or frequency, of the water temperatures collected in

5. Conclusion

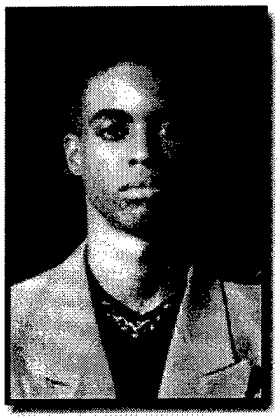
Upon the completion of our research, we realized that soil, atmosphere and hydrology play important roles in our daily lives. That is why it is very important to study these three protocols. We also noticed that as the atmospheric temperature changed, the soil and hydrology temperature changed with it. So, the atmospheric temperature depicts the hydrology and soil temperatures.

Site Managing Networks, Computers, and Services Using Administrative Tools.

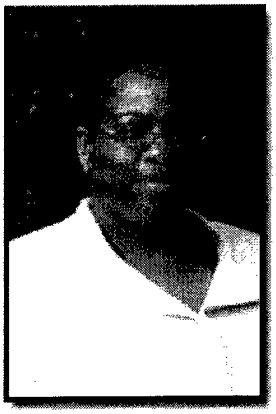
Networking Team

- Abstract
- Members
- Links

Danielle Graves



Rodney Stewart



Paula Harrell

Golar Newby

The Networking Team

Mentors:
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Kuchumbi Hayden - http://nia.ecsu.edu/onr/01_02_school_year/networking/ku.html

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Abstract

How To Site Manage Networks, Computers, And Services Using Administrative Tools.

The Elizabeth City State University Office of Naval Research 2002 – 2003 Networking Team will implement local and global site polices that will allow the Network Team to effectively administer the existing ONR and Cerser networks. First, the implementation of local security policies using Microsoft and Solaris Management Console will be used to prevent unauthorized user access and disk quota restrictions. Second, the migration of the existing NIA Web server from an Indy platform to a Silicon Graphics O2 platform will allow end-users to access its shared resources with a shorter wait state. Third, using packet analysis administrator tools to conduct a post-implementation review of the existing wireless LAN data throughput will be analyzed for data degradation within the Macintosh LAB. Fourth, load balancing the TeraScan file server, Seaserver, which is located in the Cerser Lab of Dixon Hall and the development of shell scripts to control the removal of monitoring, and trouble shooting in a Unix, Macintosh, and Windows 2000 Network Infrastructure will allow the 2003 Network team to effectively site manage the Mathematics and Computer Science Office of Naval Research Lab.

Site Management requires the Networking team to collect data from two different physical locations in one domain. Both Lester and Dixon Hall consist of 20 to 30 nodes in the Cerser and Office of Naval Research Lab. Each node may be a dual or single boot workstation or server running UNIX, Mandrake 9.0 and Windows 2000, and/or Macintosh x as the operating system. To keep track of open and/or closed projects, each team member maintains a Trouble Ticket Log file on the ecsu.edu LAN. Monitoring both sites is conducted by observing each node system's use and performance. To collect system data, the Network Team used one utility, called task Manager, which runs on a windows 2000 platform to display general system performance that can be recorded into a log file for future analysis.

The 2002-2003 Networking Team goal was to develop and implement a site management work plan throughout the Office of Naval Research labs on the campus of Elizabeth City State University. In today's society, technology advancements have allowed end-users to become more aware and knowledgeable about the different aspects of computer systems. Thus allowing the end-user to take advantage of their capabilities and perform illegal operations that can be harmful to the network and its data. In order to manage our labs from network vulnerabilities, we felt the need to develop and enhance our system of monitoring and securing our networks.

Site Management

Site management involves monitoring and traffic analysis of different data the systems in a network environment. Two types of networks are local area network (LAN) and a wide area network (WAN). A LAN deals with a connection between one or more computers that are within the same location. An example of a LAN is the computers that are in the Macintosh and UNIX lab in Lester Hall. A WAN deals with a group or cluster of computers that are not necessarily in the same location, but are apart of the same community. An example of a WAN would be the connection between the Macintosh and Unix labs in Lester Hall with the computers in the CERSER lab in Dixon Hall. Although the computers are not in the same buildings, they are still able to communicate with each other and they all are a part of the Elizabeth City State University network.

Types of Networks

LAN and WAN networks are controlled and monitored by either a LAN or WAN engineer. LAN engineers are responsible for centralized computing which involves systems that are in the same location. WAN engineers are responsible for decentralized computing, which involves systems that are not in the same location but are physically connected to the same network. Regardless of the type of network, full duplex transmissions are always taking place. Full duplex transmissions are simply exchanges of information between two systems at the same time. For example, students who are enrolled in distance learning courses communicate periodically with his or her instructor via internet and exchange information such as homework, tests, and instruction.

Security

In an article in the September 2002 edition of "Microsoft Certified Professional Magazine" entitled "You Got Hacked! Now What?," Chad Todd states that you should "Always assume a hacker has given himself or herself permissions to everything." Taking this statement into consideration, we felt the need to take extra steps to ensure the security of our computers and our network. Doing so, new security policies were set up on the computers to alert users that "UNAUTHORIZED USERS WILL BE EXPELLED, " as well as to modify local user policies. Figure 1.1 shows the steps that were taken to enable the prompt to be displayed when users attempt to log on. Also, to help provide a better sense of security, forms were developed for users to request administrator issued accounts and help if there is a problem with his or her system. Figures 1.2 and 1.3 show the "Account Request Form" and the "Trouble Ticket Form."

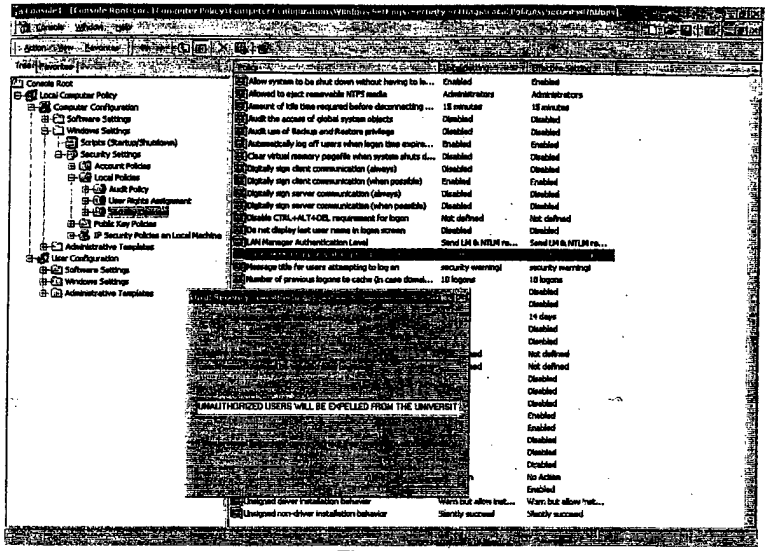


Figure 1.1

Disaster Recovery

In order to be better prepared in the case of a disaster such as fire, water damage, or data loss, we wanted to improve our current back-up system, which is a tape back-up unit that is on-site. Unfortunately, we were not able to work on this but do plan to implement it in our future plans for future networking teams. Our proposal is to have an off-site location as well as an on-site location to house our back-up storage data.

ONR/NRTS/BERSER
Request For New Account Form

Date: _____ (There is a 3-4 day waiting period after request.)
Account Type: ____ User ____ Mail ____ Other (Specify) _____
Computer Laboratory Of Requested Account: _____

Identification Information
Name: _____
(First) (Middle) (Last)
Address: _____
City: _____ State: _____ Zip Code: _____
Status: Student Intern Faculty/Staff Other
Current Email: _____

Reason For Account Request:
(Please indicate the reason account is needed and who is sponsoring the activity.)

_____
_____
_____
_____
_____
_____
_____

Accounts will be created based on information provided. An email or written confirmation of the created account will be provided. Please change your password once you have logged into the system and do not allow others to gain unauthorized access to any system. Failure to follow university policies and procedures will result in termination of account. Misuse of computer systems will result in termination of account. If there are any questions please ask before signing this form.

_____ _____
Requester's Signature Date

_____ _____
Sponsor's Signature Date

Figure 1.2

Office of Naval Research/
Network Research and Training Site
TROUBLE TICKET LOG FORM

Please print out and send completed form to:
Office of Naval Research
c/o Mr. Joey Gale
ECSU Campus Box _____
1704 Weeksville Rd.
Elizabeth City, NC 27909

Client Information:

Date: _____

Last Name: _____ **First Name:** _____

Phone Number: _____

Department: _____

Equipment Information:

What is the type of the machine that is encountering difficulties?
- ❑ SGI
- ❑ Macintosh
- ❑ PC

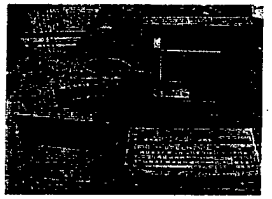
What platform/operating system is currently being used?
- ❑ Windows (please specify the version)_____
- ❑ OSX
- ❑ Unix
- ❑ Other (please specify)

Problem:
_____
_____
_____
_____
_____

Figure 1.3

UNIX Management

The Networking Team (2002-2003) analyzed two different file servers to determine if a hardware and/or software upgrade is required. The file servers examined were the NIA Web server and the SeaSpace file server.



The Network Team migrated the existing NIA Web server from an Indy SGI platform to a SGI O2 platform. The decision to migrate was based on the following findings: 1, the existing INDY operating system version 6.2 is no longer supported by SGI; 2, the software patches were out of date; and 3, SGI is currently supporting operating system version 6.7 because the source code is more reliable and stable.

FastTrack Server 2.01 is a web server application that runs on a Unix platform. The decision to upgrade from FastTrack to Apache was based on the following findings: 1, FastTrack did not support the development of customized encrypted shell scripts; 2, unsecured open TCP ports, such as, FTP and telnet; and 3, SGI does not recommend using FastTrack Server 2.01 on a production server because program can easily be hacked. It forces you to waste megabytes of system memory to run an unnecessary user interface.

Apache was developed in the early 1995, and it is based on code and ideas found in earlier HTTP servers. Apache is currently the most widely used Internet web server program. Apache is supported on a variety of platforms such as: Unix, Linux, and Windows.

Apache have made some modifications to extend its flexibility and power. Performance enhancements include more efficient handling of Hypertext Transfer Protocol (HTTP) requests, improved protection against process loading, and better error recovery. These improvements have reduced CPU load balances up to three times (see Figure 1). That directly translates to better performance for your server.

FastTrack Server 2.01 is no longer supported. This server was an entry-level web server. Since 1997, there has been very little customer interest (and no pilots or deployments) on FastTrack Server 2.01. It is not well developed. Most of all, it does not guarantee quality assurance.

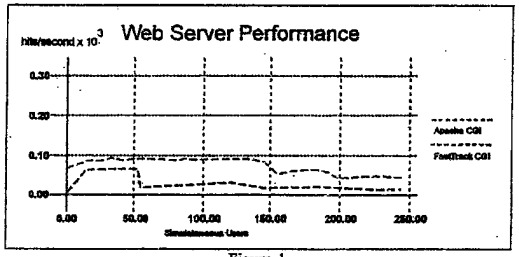


Figure 1

Features on Apache include: Virtual Subhosting, a dynamic apache module support, Java Servlets, ASP, WAP, Web Server Pages, CGI. Virtual Subhosting allows you to support multiple domain names that each resolve to their own unique subdirectory. The Apache Module is designed for adding web server features that grant web administrators and developers tremendous power and flexibility. A wide variety of

Apache modules have been created supporting all kinds of exciting web server features. Java Servlets technology provides Web developers with a simple, consistent mechanism for extending the functionality of a Web server.

JavaServer Pages (JSPs) have dynamic scripting capability that works in tandem with HTML code, separating the page logic from the static elements--the actual design and display of the page. Active Server Pages (ASP) is an open, compile-free application environment in which you can combine Hypertext Markup Language (HTML), scripts, and component calls to create dynamic and powerful Web-based business solutions. Wireless Application Protocol (WAP) is a protocol that allows wireless devices access to information and services over the Internet

The next project the network team analyzed was the SeaSpace server. The SeaSpace server was examined using the df-k command to determine the existing amount of free space available, which was 20 gigabytes of data which is equal to 20,971,520 bytes. The Network team also discovered that the server contained two-20 gigabyte hard drives instead of one 40 gigabyte hard drive. On one hard drive 10 gigabytes of data were allocated to operating system and system programs located on the root partition and the other 10 gigabytes of disk space consisted of raw data located on the /seaspace shared folder. The data analysis phase helped the network team determine the following findings: 1, the /seaspace shared folder should be moved to the second hard drive which has 20 gigabytes of unallocated disk space; and 2, the existing SeaSpace server will need a larger hard drive to store the large amounts of raw data transferred from the TeraScan server. To help manage the stored raw data, the Network Team will add the following crontab entry "0 1 * 1-12 7 rm –f /seaspace" to delete raw data every Sunday. The list of commands you schedule *cron* to run is stored in a cron table, or *crontab*. Using your own

crontab, you can schedule your server to run a certain command at a predetermined date and time.

The format of a cron table entry includes five time fields followed by a command. Commands are executed when the time specified by the date fields matches the current time. The five time fields are as follows:

Field	**Allowed Values**
Minute	0-59
Hour	0-23
Date	1-31
Month	1-12, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec
Day of Week	0-7, Sun, Mon, Tue, Wed, Thu, Fri, Sat (0 and 7 are "Sun")
*	wildcard

Furthermore, until a larger hard drive is purchased and an automated cron job has been issued to run once a week on Sunday at 1 am, the network team will continue to manually deletes the raw data to prevent the hard drive from filling up.

1) My first task was to create user files for each of my teammates onto the server machine located in room 113B. These files will give my teammates and me administrative privileges to read and write on the server platform.

2) My next task was a group demonstration. We were instructed on how to display a warning message for in-advised users on the Windows 2000 machines. Our mentor, Mr. Christopher Edwards, directed on the steps that we needed to take to complete this task.

3) My next task was a group project. We were to view the Seaserver network, located in Dixon Hall, and devise a solution to the depletion of their memory space. Suggestions were to write shell scripts that will monitor and remove unused data from the system. For future references, the data can be stored on external memory tapes.

4) Dr. Hayden's new CERSER project involves the collection of satellite data to be used by Elizabeth City State University and other authorized users. Dr. Hayden's main office is in Lester Hall, but the CERSER lab is in Dixon Hall, across the campus. My group felt that it would not be feasible for Dr. Hayden to move to and from Lester and Dixon Hall she to view the CERSER lab. With this in mind, my latest task was to setup a network with the O2 machines and the CERSER machines to give Lester Hall the capabilities of receiving raw satellite data from

the CERSER machines. Data would be sent from the satellite to the antenna on Dixon Hall. The information is gathered and placed into a shared network folder. Lester Hall's O2 machines will be able to gain access into this folder. Danielle will go more into permissions.

I began by installing a newer version of the system management software for the O2 UNIX machines. This will provide a more user-friendly system, with better and faster choice options. Next, I was to view the DHCP address number of each machine. Mr. Kachumbi Hayden instructed me to change these numbers from dynamic to static. He, also, told me to place the new address numbers into the system .jot files of each machine. This will allow each machine to have the DHCP addresses of each machine in its memory. Dr. Powell's graduate students, at The University of Missouri, developed a program to view and manipulate raw multi satellite data. His students are using their program for their research thesis. This program was installed onto the O2 machine. The program will collect the data sets from the shared CERSER network folder and place them into an image spreadsheet. During a test run, I was able to view sea surface gauge data of rainfall over the ocean. The spreadsheet contained multiple frames of data, which I could manipulate.

With this new setup, Dr. Hayden will no longer have to visit Dixon Hall to see the incoming data. She can now use Lester Hall's labs as a network to Dixon Hall. Future plans on this project would be the possible installation of the program onto

the Window platform personal computers, and possibly the Macintosh G3 computers.

1. Site management (LAN Administrator)

Segment Managed: Lester Hall SGIs

Analysis and update of videoconference system

The Intel Team Station 384 Videoconference System is comprised of a tower shaped motherboard and housing unit. The Pentium III processor is the CPU (Central Processing Unit) of the computer and helps to drive the computers actions once directed by the users input. The Pentium III integrates many of the best attributes of P6 micro-architecture into its chip. Some of the features are Dynamic Execution performance, a multi-transaction system bus and Intel MX media-enhancement technology (G.C. Systems, 2003). An advantage of implementing the Videoconference System with a Pentium III processor is the advance imaging and efficient streaming of audio/video data across an established Internet connection. Seventy new instructions are incorporated into processor giving far greater possibilities than older models that where more limited in the amount of instructions they were able to understand and code. Some of the technical specifications of the Pentium III processor are:

- Core speeds of up to 1 GHz
- 133 MHz and 100 MHz system bus design
- Internet Streaming SIMD Extensions
- Incorporated 256 Kb Error Correcting Code cache
- Intel MMX media-enhancement technology
- Dual Independent Bus (DIB)
- Intel® processor serial number
- Non-Blocking L1 cache
- Memory cache ability ranging from 4Gb to 64Gb
- Dual processor capable
- Data integrity and reliability

(G.C. Systems, 2003)

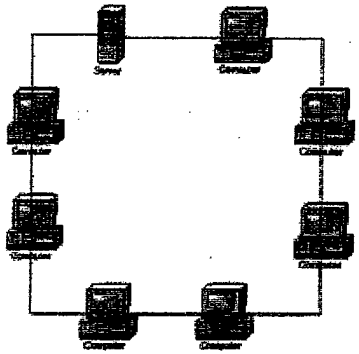
Also included in the Videoconference System is 256Mb of physical memory. This amount of memory was the ideal for the operation of the Pentium III processor. The memory available for an operating system is important in the management of resources. With a Videoconference System there are many different applications that will be running in the foreground as well as in the background. As noted by Edmead and

Hinsberg (1998) "When an application is executed, the application is loaded into memory and allocated a certain amount of physical address space." For every execution of an application, memory is reserved for portions of the program to be loaded into memory. The entire program is not loaded because it would be too big to load, but by loading portions of an application's instruction into memory the Pentium III processor is able to load the instructions quickly. Once a set of instructions has been, executed new instructions are loaded in place of the older ones. The job of loading and unloading these types of instructions is left to the operating system.

The appropriate operating system for the Intel Pentium III Team Station 384 Version 5.0 Videoconferencing System is the Windows NT Version 4.0.1381. According to modern standards, the Windows NT Version 4 is obsolete and several upgrades to the operating system have been made. One of the upgrades and main reasons for using the Windows NT operating system for a networked system is for security and memory handling capabilities. In a Videoconference System security is another vital aspect. The security of the system helps to prevent anyone from just turning on the computer and making video calls. The system requires that someone logon to the system before any application can be accessed or modified. The Windows NT operating system also provides help in advance networking procedures. The administrative tools can regulate the amount of access individuals can have applications or if certain users can even access a program. Through administrative tools an administrator can have the ability to optimize the computer system environment to meet the needs of a particular network.

The network can play a major role in the performance of a Videoconference System. There are several different types of network environments and each one has its advantages and disadvantages. One type of network design is ring topology. Figure 1 is

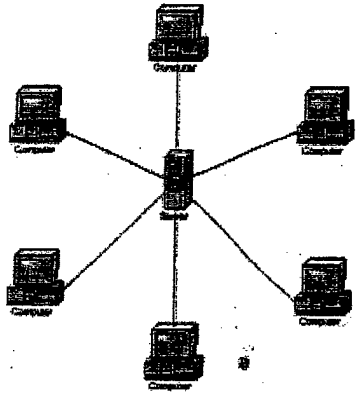
based on graph found in a discrete mathematics book by K. Rosen (1999) and is an example of how a possible ring network might be shaped. Ring topology's advantage is network stability, meaning if a node (computer system) was to become unavailable for usage another path could be utilized for making a connection. The disadvantage of the ring topology is using this type of connection requires a longer transmission time for network nodes that are farther away from the server or destination node. Another disadvantage to this type of topology is that if several nodes were to become unable to transmit a connection signal then operational nodes may be unable to communicate with any other working node on the network system.



(Figure 1)

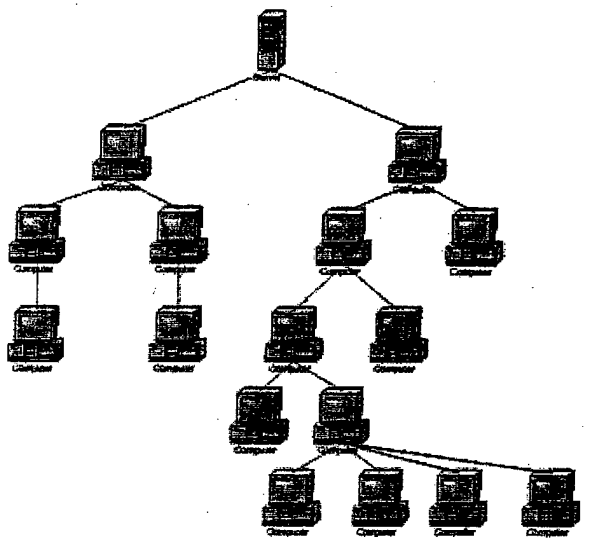
Another type of topology that will have an effect on the capability of the Videoconference System is the star topology. This kind of network mapping is more common in systems with routers. Figure 2 is modeled after Tanenbaum's (1996) graphs and shows the star topology with just one server and several different nodes. The advantage of this type of topology is the amount of connection time required to transmit data to a destination. The star topology requires little time to transmit information

because the connections are more direct. A disadvantage to this type of system is that there is only one connection for a system to connect with the server. If the connection path were to be disrupted then there would not be any redundancy for another connection path.



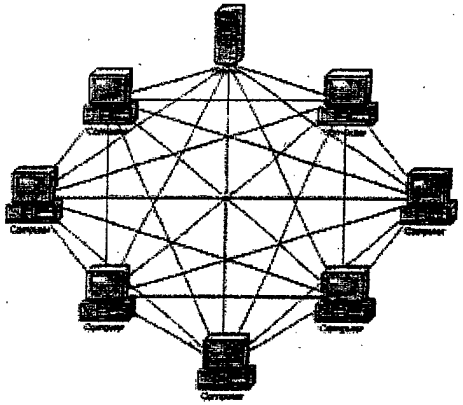
(Figure 2)

Another type of network connection topology that could have great affect on the quality of a Videoconference System is a tree topology. As the name suggest the tree topology resembles a tree in shape. The advantage of a tree topology is the ease in which trouble-shooting procedures can be conducted. With a tree topology a troubled section can be easily found because all other network nodes will be unavailable that branch from the source of trouble. The disadvantage is that if one node becomes disconnected several key nodes may also be affected and there is no redundancy in the network to recover. Figure 3 is an example of a tree graph based on an illustration (Raus, 2000).



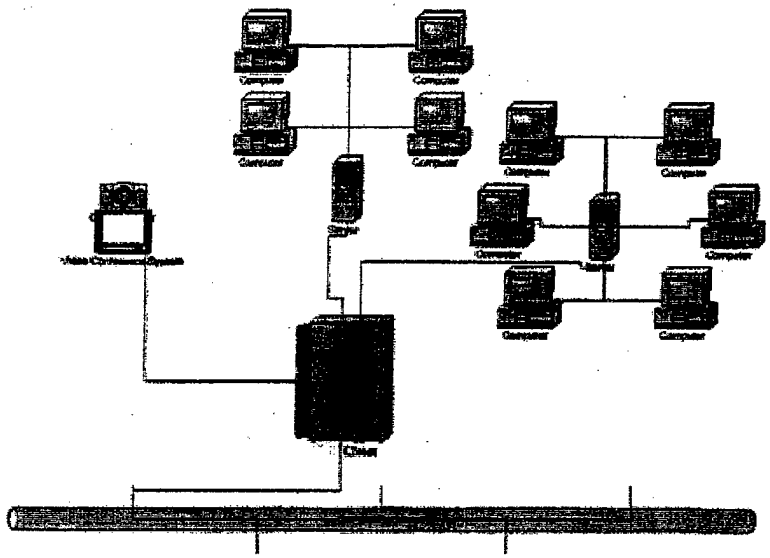
(Figure 3)

One of the last types of topologies that will be discussed in this paper is the full mesh. Network environments that have similar features as a ring topology and star topology are classified as full mesh. The full mesh graph takes the best from both types of network topologies and combines them so the systems can have fully connected systems. The great advantage of having a fully connected network environment is that the system is able to recover very well from a node going down. Another advantage is that multiple paths can allow for much more efficient network paths. Figure 4 is an example of the full mesh topology that was based on interpretation from G. Hart-Davis and L. Lee (2000).



(Figure 4)

The advantages and disadvantages of each network environment topology can help to utilize the capabilities of a Videoconference System. Using the incorrect type of network can cause the system to greatly affect other nodes on a network causing major delays to critical nodes such as mail servers, wireless servers, web servers, firewalls, and other different types of nodes. The Intel Pentium III Team Station 384 Version 5.0 Videoconferencing System is on its own connection system, but resembles the star connection in that the system connects almost directly to the Internet backbone of Elizabeth City State University. The connections look similar to figure 5, but keep in mind that no routers, switches and hubs have been included.



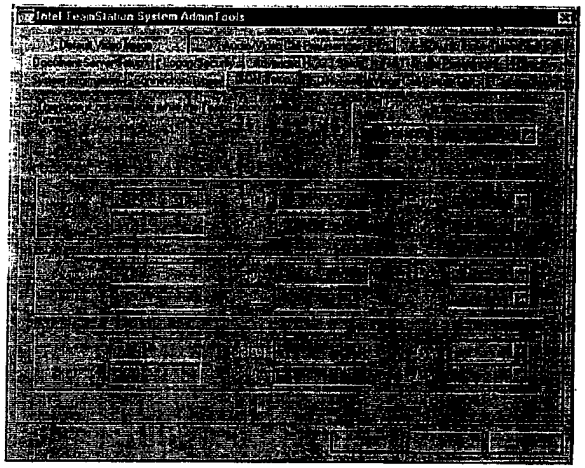
(Figure 5)

Chapter IV. The configuring and analysis of the Videoconference System

Understanding how the Videoconference System's hardware interacts with the network is just a portion of the complex puzzle involved with the evaluation of the system. Configuring the system requires understanding those topics mentioned throughout the beginning of the paper as well as some understanding of the Intel Videoconference System's software. Upon starting the system the security features start to take affect, locking all application so that no unauthorized usage may occur. Through special permission, the administrative privileges where granted to permit the configuration of the system. Once a correct login is achieved the next step is to identify the exact name and version of the software that was installed on the system. Results showed that the system is an Intel Pentium III Team Station 384 Version 5.0 Videoconferencing System. The next step is looking for the any manuals that may be installed or any online guides. The online search revealed that the system is no longer being offered in technical support plans available from Intel, but the website did offer many frequent asked question and their corresponding answers. Also a search of the files installed revealed a manual in Printable Document Form, which proved to be useful in trouble shooting problems that arose.

Upon executing the Intel software for the system, it was shown that system was indeed configured to use an Integrated Services Digital Network (ISDN) connection. ISDN is defined as "a standard for world-wide digital communications network originally designed to replace all current systems with a completely digital, synchronous, full duplex transmission system" ("Dictionary of Networking", 2000). The obvious advantage of using ISDN is the rate of throughput, or rate at which the- date can be sent divided by time. For one ISDN connection, a throughput of 0.128 Mega bits per second ("Data Rate

Standards", 2003), can be generated within optimal conditions. The Videoconference System was configured and equipped to handle three lines at one time. The implications of having three possible ISDN connection lines is that one connection can be completely dedicated to supplying video, while another can be completely dedicated towards supplying audio. With the two previous ISDN connections occupied with outputting data, the third line can be solely responsible for taking input from another user. Another unexpected advantage of the system is that for every one ISDN line provided, two regular modem connections could be made. In a sense a lab on campus could provide Internet service to students. If an additional fee was paid to receive a one eight hundred number then the lab could provide Internet services to faculty and students that were at conferences or presenting in another state. The ISDN connection seems to have a far superior advantage in the configuration setup over a regular RJ45 connection. The disadvantage of using the ISDN connections on the campus of Elizabeth City State University is the addition cost of the connections. In order for an ISDN provider to supply three numbers to a user the cost can be several thousand dollars every year. The cost over several years can add up. The financial cost becomes an issue when the Videoconference system is only used a few times a year. Figure 6 is the configuration window of the ISDN connection as provided by the system.



(Figure 6)

In retrospect to ISDN connection, the Videoconference System allows for another form of connection called RJ45 or T1. The RJ45 connection allows for a throughput of 1.544 Mega bits per second ("Data Rate Standards", 2003). ISDN only has a throughput of 0.128 Mega bits per second in comparison. The RJ45 connection can transport much more information at one time than ISDN, but the Videoconference System only allows for one of these connections at a time. The result is that the information will be transmitted and received on the same connection resulting in possible loss of some data or possible delay. A tremendous advantage that a RJ45 connection provides is that the campus already has the connection installed in most buildings. Since the RJ45 connection is provided be the university there would be no cost to the end user. For many of those reasons the connection configuration of choice will be RJ45. It is note worthy to mention that none of the situations mentioned above in the paper include forms of jitter, or noise

that could be introduced through other network devices such as routers, switches, bridges and hubs.

Now that the selected connection type has been selected the next option to set is the connection protocol. There are two common types of protocols, TCP/IP and UDP. "Transmission Control Protocol / Internet Protocol is a set of communications protocols first developed by the Defense Advanced Research Projects Agency (DARPA) in the late 1970s. The set of TCP/IP protocols encompasses media access, packet transport, session communications, file transfer, e-mail, and terminal emulation" ("Dictionary of Networking, 2000"). TCP/IP is one of the most common application protocols for transmission and reception of data. TCP/IP started when application programmers programmed their own Internet protocols for just their particular applications. After a few years a common trend among these protocols was noticed and the Defense Advanced Research Project Agency (DARPA) developed and released what is commonly referred to TCP/IP. There have been several advances to the protocol since its initial release, but the principals of the protocol are the same. The way that TCP/IP protocols works is a piece of information is broken down into specific packets. Each packet is tagged with a header file. The header file serves many different purposes; one being it includes the identification number of the packet being sent, two being the destination address of the packet, three is the source address of the packet, a hop counter for measuring amount of travel the packet is doing, and other various flags / warnings. The importance of the measuring the amount of hops a packet under goes is so that the system does not get clogged with lost packets of information. Each packet of information has a default number of 24 hops to reach its destination, which is well over the number required usually. Each time the packet hops to a router and leaves the counter is decremented by

one, until the number reaches zero. When zero is reached the packet is dropped and considered lost. The advantage of using TCP/IP is that if a packet was lost in a transmission process a recovery could be made. TCP/IP uses a packet confirmation system to ensure that the packets all arrive. If a packet was to be dropped or lost the destination computer could tell based on the received identification numbers, what packet / packets were lost and ask the source computer to retransmit the requested packets of information. Once all packets have reached the destination computer the system performs a putting together of the packets. An example of TCP/IP is a common every day puzzle. If student1 had the puzzle put together in one classroom, but wanted to give the puzzle to student2 in another classroom using a messenger, the messenger would take the one numbered piece from student1 and give it to student2. Student2 could look at the number and see exactly how the piece would fit. Once the messenger returned and confirmed that student2 did receive the piece then student1 could proceed to send other pieces until the picture of the puzzle was clear.

In contrast to TCP/IP is the User Datagram Protocol (UDP). UDP is defined as "The connectionless, transport-level protocol used in the TCP/IP suite of protocols, usually bundled with IP-layer software. UDP does not add overhead, as does connection-oriented TCP, UDP is often used with SNMP (Simple Network Management Protocol) applications" ("Dictionary of Networking", 2000). In other words UDP does not involve all of the confirmation procedures that are required for TCP/IP. UDP packets are similar to TCP/IP packets in that there is an identification number for the packets. UDP header files also include a hop counter, source address, destination address and other flag options. UDP works by simply making a connection to the destination computer and then sends data through the connection. The destination computer just receives the information

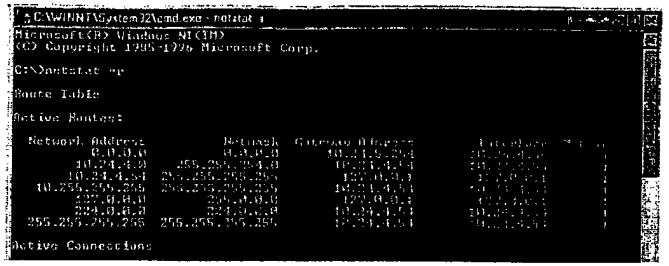
and tries to make the information fit together. The major advantage of this type of protocol is that transmission times are very fast because there are fewer overheads in the transmission process. There are several disadvantages to this type of protocol. One disadvantage is that if a packet were to be lost there would be no way of recovering the lost of that packet. In the case of a packet being lost the source computer would need to retransmit the information completely over again and hope that no other packets would be lost again.

With the Videoconference System there are advantages from both protocol modes. With TCP/IP the Videoconference System could securely transmit documents to other destination systems without the worry of corrupted data because of the lost of a single packet. On the other hand the increase in transmission speed for the video is an added bonus for using the UDP protocol. The video feed for the system does not need to worry about a lost packet because it would just be viewed as a brief break in the picture and the audio would just sound like a skip in speech. On the other hand continued breaks in video and audio could diminish the interactive feel of the Videoconference System. Taking all of the factors into consideration the logical choice for the system would be TCP/IP. The configuration of TCP/IP would allow the system to interact much better than the UDP protocol.

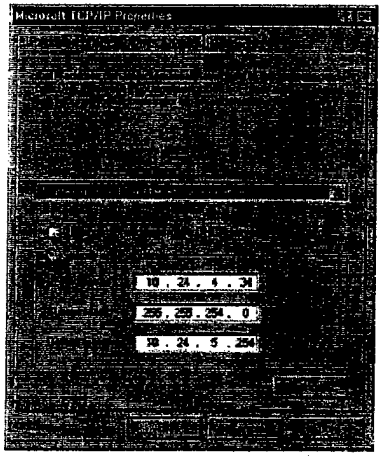
The next configuration that is needed for the system is setting the Internet Protocol address. Currently, most of the computers in Dixon Hall are set for Dynamic Host Configuration Protocol (DHCP). DHCP is "a system based on net-work interface card addresses that is used to allocate IP addresses and other configuration information automatically for net-worked systems" ("Dictionary of Networking", 2000). DHCP is useful to for system administrators. DHCP allows an administrator to collect a pool of

useable IP address and randomly assign them to machines that request them. For example if there was an office building with over 300 individual computer systems and only one system administrator, that system administrator would be challenged managing all of the IP addresses for each system. With DHCP the administrator just needs to plug the connection in and let the computer pick from a list of available IP addresses. This saves the system administrator the time of going to each system and manually setting the configuration, however there is a draw back to this type of assignment. If there was a lost of power over night then it is possible that no one would have the same IP address previously stored on their system. Instead when the computer boots up a new address would be assigned to the system. In the instance of a web server with DHCP, that could spell death for users trying to access the website because the IP address would not be the same. When someone tries to open the website they could be directed to anyone of the 300 hundred systems which would cause a huge delay in connectivity for that end user. The end affect is that the website would produce an error message for anyone trying to access it. This affect directly correlates with the Videoconference System because the IP address is what is dialed. Imagine if someone wanted to call you, but the number has changed and there is no forwarding number given.

Assigning a static IP address easily solves the problem of a random IP address. Static IP addressing is common for servers and key systems. A static IP address is one that will always be assigned to that particular machine until otherwise instructed. The static IP address for the Videoconference System is 10.24.4.34. Figure 7 is an example of the routing table used to retrieve the Videoconference System's random IP address and Figure 8 is the application window used to program the static IP address of the system.



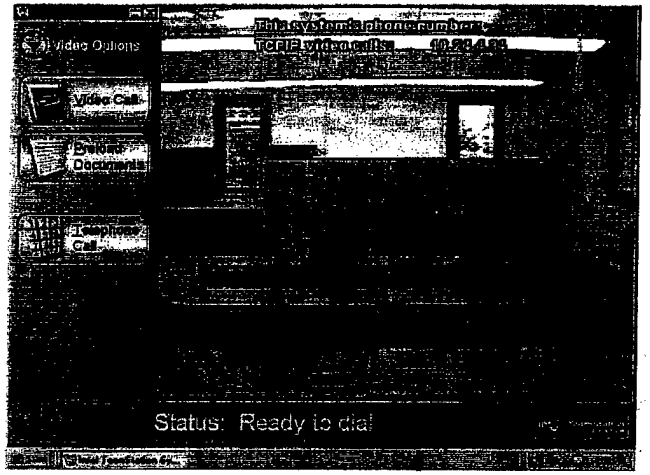
(Figure 7)



(Figure 8)

The system is now ready to be tested in a video call. For the purposes of testing the Videoconference System a Veo Digital Web Camera was implemented on a Windows ME operating system. The computer that will operate the Veo Digital Web Camera is a Hewitt Packard Pavilion N5470 with an AMD 4 Athlon processor. The purpose of the Veo Digital Web Camera is to confirm whether the Videoconference System is

transmitting and receiving correctly, not to compare speed of transmission. Figure 9 is an example of how the initial startup screen is displayed once the application is loaded.



(Figure 9)

The initial startup screen gives the systems current phone number / IP address. The startup screen also allows the user to place a video call, preload documents, and make a telephone call. In order to place a call the user needs to know the address of the system that he/she will be calling. The user also needs to have the system configured to automatically answer incoming calls or the system will just ring to alert someone that a phone call has been made to the system. With the automatic answering service, the system can be left on if another user, in a different location, would like to test there Videoconference System while a user is not present. The preload document option gives the user a chance to load any documents that may be used during the videoconference before the conference starts. This saves a great deal of time when there are many

documents that will be used or when the end user has a slower connection. Preloading documents can also help to give the conference a goal to strive towards. Often time people want to speak at the same time and that will greatly influence the noise that one would hear because it will literally sound as if everyone is speaking at the same time and then there is the added background noise that is add from others not participating in the conference. Preloading documents can eliminate many of the questions that may be asked, by providing an outline of the conference.

After several tests of the system the implementation of the TCP/IP connection resulted in a successful evaluation of the video and audio capabilities of the system. The system was able to communicate successfully with the Veo Digital Web Camera. The Intel Pentium III Team Station 384 Version 5.0 Videoconferencing System was able to display the video feed that was coming from the Veo Digital Web Camera and there was little delay as a result from the connection change. The following resulting figures were generated from the cameras. Figure 10 is the Veo Digital Web Camera and figure 11 is from the Videoconference System.

(Figure 10)

(Figure 11)

Appendix

- Highlights & Photo Pages
- Honors Convocation Program

Elizabeth City State University

ELIZABETH CITY, NORTH CAROLINA

MICKEY L. BURNIM, CHANCELLOR

Honors Convocation

Thursday, April 17, 2003
2:00 o'clock in the afternoon
The Floyd L Robinson Auditorium
Fine Arts Complex

Elizabeth City State University is a constituent institution of
THE UNIVERSITY OF NORTH CAROLINA

Honors Convocation Program

PRELUDE ..... *"Legende"* ..... Henryk Wieniawski
Dr. Penny Kwiatkowski, *Violin* and Dr. Dangsun Song-Lee, *Piano*

PROGRAM

Dr. Carolyn Mahoney, *Vice Chancellor for Academic Affairs*
- Presiding -

THE POSTING OF THE COLORS ..... ECSU ROTC

INVOCATION ..... The Reverend Dr. John Luton
Department of Language, Literature & Communication

MUSICAL SELECTION ..... *"I Want Jesus To Walk With Me"* ..... Jester Hairston
The University Choir
Professor Billy C. Hines, *Conductor*

INTRODUCTION OF SPEAKER ..... Mr. Don Morring
Sophomore, Honors Program

ADDRESS ..... Dr. Camellia Okpodu
Interim Chair of the Biology Department
The Marshall A. Rauch Distinguished Professor of Biology

PRESENTATION OF AWARDS ..... Dr. Bonita Ewers
Associate Vice Chancellor For Academic Affairs
Dr. Carol Calloway Jones
Director, Honors Program
Miss Joy McGhee
Junior, Honors Program

CONGRATULATIONS ..... Dr. Mickey L. Burnim
Chancellor

ANNOUNCEMENTS ..... Miss Jamica Ashley
Sophomore, Honors Program

THE RETIRING OF THE COLORS ..... ECSU ROTC

POSTLUDE ..... *"Liebeslied"* ..... Fritz Kreisler
Dr. Penny Kwiatkowski, *Violin* and Dr. Dangsun Song-Lee, *Piano*

Special Honors

CHANCELLOR'S DISTINGUISHED EMBLEM AWARDS

Scholars' Blazers

Natasha Coley
Vincent Davis
Crystal Foust
Billie Malatesta
Amy Morgan

RECIPIENTS OF AWARDS

The Honors Program Certificates of Merit 2001 - 2002

Catina Alston
Branden Anderson
Vicky Arrington
Jamica Ashley
Shannon Autry
Bernard Bailey, Jr. ✓
Jessica Barrier
Kimberly Bond
Tameka Braswell
Asani Brewton
Tamarah Bridges
Gregory Burgess
Ryan Caruso
Carla Chambers
Carinthia Cherry
Gamaliel Cherry
Alvita Clark
Tabitha Clemons
Natasha Coley
Darius Cooper
Julius Council
Charlie Cuffee ✓
Vincent Davis, Jr. ✓
Norma DeVita
Marcos Fabio ✓
Crystal Foust
Sharon Gorgani
Danielle Graves ✓
John Griffith, Jr.
Alicia Harrell
Danielle Harrigan
Rhonda Holmes
Shinika Johnson
Tracie Johnson
Pamela Jones
Casey Keys ✓
Clayton Knight
Damion Lewis
Roy Martin
Melvin Mattocks ✓
Vivian McDaniels
Joy McGhee
Carrie Miller
Kevin Moore
Amy Morgan
Don Morring, Jr.
Joy Myers
Golar Newby ✓
Tierra Porter
Jennifer Prayer ✓
Jessica Prayer
Jennifer Pride ✓
Elizabeth Rascoe
Donna Richards
Keith Richardson
Cleantha Samuel
Tiffany Shearn
Janice Silver
Damiyon Sledge
Beshelya Smith
Eunice Smith ✓
Zenika Spence
RaShawn Spencer
Keisha Stephenson
DeTra Stith
Kymber Taylor
Laysha Taylor
LaQuisha Tisdal
Andrew Vinson, Jr. ✓
Nicole Walker
Christopher Warden
Jamal Willis
Takia Winrow

HONORS PROGRAM DARIN L. COLE AWARD ..... Joy McGhee

THE HONORS PROGRAM GREEK CUP ..... Delta Theta Chapter Alpha Kappa Alpha Sorority, Inc.

ART

Achievement Award ..... Natasha Wynn
Merit Award ..... Melody Lynch

BIOLOGY

Clarence E. Biggs Award ..... Patrice Boyce
Curtis D. Turnage Award ..... Vivian McDaniels
Herman G. Cooke Research Excellence Award ..... Don Morring, Jr.
Freshman Certificates of Merit ..... Amanda Beavers, Tarhata Newby
Sophomore Certificate of Merit ..... Ryan Caruso
Evans-Patterson Science Award ..... Vincent Davis, Jr.

BUSINESS AND ECONOMICS

Outstanding Graduating Senior Award ..... Neils Riberio
Gateway Bank/Richard Whiting Outstanding Junior Award ..... Demetra Gilmore
Gateway Bank/Richard Whiting Most Improved Student Award ..... Linh Nguyen
RBC Centura Bank Outstanding Business Administration Award ..... Kristel Hedgepeth
First Citizens Bank Outstanding Accounting Major Award ..... Cindy Griffin

CHEMISTRY AND PHYSICS

Rochelle Cleaners Excellence in Chemistry/Physics Award ..... Vincent Davis, Jr.
Certificates of Academic Excellence ..... Ramatoulie Bah, Linwood Creekmore, III
Torreon Creekmore, Vincent Davis, Jr., Marcos Fabio, Kevin Moore
Society of Physics Students (SPS) Award - Sophomore ..... Marcos Fabio
Society of Physics Students (SPS) Award - Junior ..... Linwood Creekmore, III
Society of Physics Students (SPS) Award - Senior ..... Vincent Davis, Jr.
Society of Physics Stduents (SPS) Award - Outstanding Achievment in Physics ..... Ramatoulie Bah
Torreon Creekmore, Vincent Davis, Jr.

EDUCATION AND PSYCHOLOGY

Charles A. Bryant Scholarship ..... Carl Seward
Claude W. & Lois W. Green Scholarship ..... Tarhata Newby
Academic Achievement in Elementary Education ..... D'Andra Compher
Barbara Beck, Michelle Pennington
Academic Excellence in Middle Grades Education ..... Cristy Binder
Psychology New Student of the Year ..... Corinne Geary
Psychology Sophomore of the Year ..... Joy Myers
Psychology Junior of the Year ..... Kimberly Green
Psychology Senior of the Year ..... Kathleen Stadler
Psychology Student of the Year ..... Teresa Watkins
Teacher Education Academic Achievement Award ..... Cristy Binder, Roberta Branch
Megan Bunch, Heather Copeland, Rose Figura, Kimberly Maggette
Penelope Pugh, Angela Rountree, Kristen Waters, Lauren Woolard

EDUCATIONAL TALENT SEARCH

Academic Excellence Award ..... Tarhata Newby
Exemplary Service Awards ..... Shayla Brooks
Krystal Harris, Tracie Johnson
Tahquetta Jones, Elizabeth Rascoe

GENERAL STUDIES

General Studies Academic Achievement Award ..... La'Varis Poole

GEOLOGICAL, ENVIRONMENTAL AND MARINE SCIENCES

Geology Academic Excellence Award - Freshman ..... Lindsey Hayes
Geology Academic Excellence Award - Sophomore ..... Asani Brewton
Geology Academic Excellence Award - Senior ..... Patty Rennert
Marine Environmental Science Academic Excellence Award - Junior ..... Emma Sawyer
Marine Environmental Science Academic Excellence Award - Senior ..... Cleantha Samuel

INCENTIVE SCHOLARSHIP PROGRAM

Outstanding Freshman Incentive Scholar ..... Heather Copeland
Outstanding Sophomore Incentive Scholar ..... Don Morring, Jr.

Outstanding Junior Incentive Scholar ..... Carrie Miller
Outstanding Senior Incentive Scholar ..... Natasha Coley

LANGUAGE, LITERATURE & COMMUNICATION

Graduating Senior Award ..... Antonio Barrow
E. M. Spellman Award ..... Antonio Barrow

MATHEMATICS & COMPUTER SCIENCE

ONR Research Award of Excellence ..... Ramatoulie Bah
ONR Research Program Awards ..... Anthony Anderson, Willie Brown
Willie Gilchrist, Demetrius Rome, Karitsa Williams
Office of Naval Research Scholars Awards ..... Shayla Brooks, Dana Brown
Vincent Davis, Jr., Danielle Graves, Javon Griffin, Paula Harrell, Golar Newby
Carl Seward, Eunice Smith, Rodney Steward, Nelson Veale, Jeff Wood
J. L. Houston Mathematical Sciences Award ..... Golar Newby
Umfort Locus Computer Science Award ..... Darius Cooper

MILITARY SCIENCE

Academic Sophomore Achievement Award ..... Leslie Holden
Academic Junior Achievement Award ..... Candida Bond
Academic Senior Achievement Award ..... Donna Richards

MUSIC

Music Department Award ..... Branden Anderson, Jennifer Futrell
Edna Davis Award ..... Dale Pendleton
Charles Penrose Award for Woodwind ..... Andrae Banks
Florence Folks Lassiter Scholarship ..... Dale Pendleton

RONALD E. McNAIR POSTBACCALAUREATE ACHIEVEMENT PROGRAM

Eagle Award ..... Carl Seward
Challenger Awards ..... Shayla Brooks, Tanya Chesson
Vincent Davis, Jr., Fatina Smith, Chaquella Worthington
Excellence Without Excuse Award ..... Natasha Coley

SOCIAL SCIENCES

Academic Excellence in Criminal Justice ..... Sharon Creef
Academic Excellence in Sociology ..... Theo Bohn
Academic Excellence in History ..... Mary Parker
Academic Excellence in Political Science ..... Jerry Lane, Jr.
Social Work Highest GPA Award / Non-Transfer ..... Natasha Coley
Social Work Highest GPA Award / Transfer ..... Jennifer Clagg
Social Work Achievement Awards ..... Jennifer Clagg, Natasha Coley
Elaine Fleetwood, Krystal Harris, Carrie Iseghohi
Pamela Jones, Davona Mitchell, Chaquella Worthington

STUDENT AFFAIRS DIVISION

Davis Cup ..... Complex Residence Apartments
Accepting - Crystal Foust, Vincent Davis, Jr.
Honda Campus All-Star Challenge Team ..... Donald Cartwright, Kimberly Hoggard
Clayton Knight, Shannon Penn, Khory Perry
Commuter Student-of-the-Year ..... Virginia Talmadge

STUDENT SUPPORT SERVICES PROGRAM AWARD ..... Terrunda Taylor

TECHNOLOGY

Technology Faculty Award - Freshman-Industrial Techonology ..... Donald Tinsley
Technology Faculty Award - Freshman-Aviation Science ..... Jameson Clark
Technology Faculty Award - Sophomore-Industrial Technology ..... Raheim Helms
Technology Faculty Award - Junior-Industrial Technology ..... Joshua Sawyer, Micheala Williams
Technology Faculty Senior Award - Industrial Technology ..... Steven Gordin

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CLUBS AND ORGANIZATIONAL AWARDS

The Alpha Kappa Alpha Sorority, Incorporated Scholarship
Delta Theta Chapter ..... Carl Seward

The Alpha Kappa Alpha Sorority, Incorporated Scholarship
Zeta Kappa Omega Chapter ..... Crystal Davis

The Delta Sigma Theta Sorority, Incorporated Scholarship
Elizabeth City Alumnae Chapter ..... Tina Noriega

Class of 1967 Scholarship ..... Dashaun Dorsey
Tamika Groves

WHO'S WHO

Catina Alston
Branden Anderson
Patrice Boyce
Natasha Coley
Joseph Cochran
Linwood Creekmore, III
Vincent Davis, Jr.
Norma DeVita
Demetra Gilmore
Javon Griffin
Tamika Groves
George Jerman, Jr.
Courtnay Jordan
Jerry Lane, Jr.
Jason Mitchell
Golar Newby
Jonathan Owens
Tanyetta Pittman
Neils Ribeiro
Keith Richardson
Cleantha Samuel
Carl Seward
Kristen Snead
DeTra Stith
LaQuisha Tisdal
Deborah Vines
Monica Vrablic
Kevin Wade
Tracey Ward

Chancellor's Distinguished Emblem Award
Spring Semester 2001-2002

Rebecca Armstrong
Melissa Austin
Shannon Autry
Ramatoulie Bah ✓
Jessica Barrier
Keiomi Berry
Tonya Brinkley
Naighani Broughton
Eric Byrum
William Chappell
Carinthia Cherry
Catreina Cherry
Gamaliel Cherry
Tabitha Clemons
Natasha Coley
Vincent Davis, Jr. ✓
Crystal Foust
Gregory Gilbert
Sharon Gorgani
Jean Griffin
Kristel Hedgepeth
Rebecca Hoeppner
Sherri Horner
Tiffany Jones
Crystal Jordan
Monique Joyner
Billie Malatesta
Heather Malone
Vivian McDaniels
Barbara McDermott
Joy McGhee
Carrie Miller
Amy Morgan
Don Morring, Jr.
Michael On
Devine Overton
Crystal Owens
Inger Parker
Tierra Porter
Joshua Quidley
Latonya Raynor
Donna Richards
Cleantha Samuel
Sharonne Sawyer
Jenny Scott
Kristi Shank
Crystal Simpson
Beshelya Smith
Kacey Smith
Zenika Spence
Risha Stallings
Kristin Suchy
Virginia Talmadge
Laysha Taylor
Tia Thorne
Kevin Wade
Tanya Warde
Lasindra Webb
Davina White
Delia Wiggins
Rukiya Williams
Chaquella Worthington
Elaine Yarborough

Chancellor's Distinguished Emblem Award
Fall Semester 2002-2003

Enoch Alexander
Branden Anderson
Chrystal Anderson
Vicky Arrington
Jamica Ashley
Shannon Autry
Ramatoulie Bah ✓
Joanelle Baptiste
Antonio Barrow
Amanda Beavers
Amy Benton
Naiyhani Broughton
LaraeShontee Butcher
Anna Cahoon
Ryan Caruso
Jameson Clark
Natasha Coley
Ava Cooper
Darius Cooper ✓
Ebony Copeland
Heather Copeland
Norma Devita
Dashaun Dorsey
Lisa Duke
Marcos Fabio ✓
Crystal Foust
Sharon Gorgani
Danielle Graves ✓
Kimberly Green
Javon Griffin ✓
Katherine Harrell
Sheena Harrell
Lindsey Hayes
Bonnie Higgins
Leslie Holden
Jean Jackson
Clayton Knight
Betty Liles
Nikki Luton
Dreama Lyons
Casey Maderazo
Billie Malatesta
Heather Malone
Joy McGhee
Lauren Meads
Carrie Miller
Jasheen Mizelle
Amy Morgan
Don Morring, Jr.
Tarhata Newby
Jonathan Owens
Tierra Porter
Jennifer Prayer ✓
Jessica Prayer ✓
Joshua Quidley
Michelle Ragland
Neils Ribeiro
Yvonne Ribeiro-Yemofio
Keith Richardson
Demetrus Rorie ✓
Cleantha Samuel
Jenny Scott
Carl Seward ✓
Eunice Smith ✓
Sandra Sneed
Shontel Spruill
Lisa Spry
Tracy Staton
Louise Steiner
DeTra Stith
Timothy Summers
Terrunda Taylor
Tia Thorne
Donald Tinsley
Chukwuemeka Ugochukwu
Jennifer Vanhorn
Kristen Waters
Jeffrey Wood
Natasha Wynn

Honors Spring Semester 2001-2002

Chancellor's List: 3.75 to 4.0 Average

Dixie B. Armstrong
Rebecca D. Armstrong
Theresa Ly. Atwood
Melissa R. Austin
Jason R. Baccus
Ramatoulie Bah
Deanne M. Bailey
Joanelle J. Baptiste
Jessica A. Barrier
Barbara J. Beck
Kelomi N. Berry
Leigh A. Bierman
Cristy S. Binder
Roberta D. Branch
Tara D. Brinkley
Tonya Brinkley
Leslie A. Brothers
Naiyhani C. Broughton
Clinton D. Burdick
Mary L. Bynum
Eric M. Byrum
Ryan J. Caruso
William H. Chappell
Carinthia A. Cherry
Catreina D. Cherry
Gamaliel R. Cherry
Jennifer L. Clagg
Tabitha O. Clemons
Betty Cobb
Natasha S. Coley
Joynell T. Collins
D'Andra H. Compher
Darius Cooper
Sharon S. Creef
Vincent A. Davis
Shannon A. Doyle
Lisa C. Duke
Autum P. Edwards
Alica K. Evans
Amber L. Everett
Romona G. Ferebee
Marquita L. Figgs
Kimberly D. Fisher
Crystal R. Foust
James W. Fox
Christi Froelich
Jennifer A. Futrell
Gregory J. Gilbert
Sharon L. Goehring
Steven D. Gordin
Sharon Gorgani
Dean J. Gough
Shkia J. Grant
Dave L. Gray
Jarvis Kevin Gray
Makitta M. Gregory
Jean Griffin
Patricia E. Griggs
Linda W. Grimes
Victoria G. Hall
Gail M. Harris
Kristel L. Hedgepeth
Thomas B. Heggie, IV
Marcia P. Hobbs
Rebecca L. Hoeppner
Lakesha Holley
Sherri G. Horner
Cynthia E. Howington
Stephanie Humphries
Egony M. Hunter
David W. Jackson
Debora L. Jackson
Jean L. Jackson
Amber D. Johnson
Gloria L. Johnson
Selena O. Johnson
Tiffany L. Jones
Crystal L. Jordan
Monique S. Joyner
Clayton Knight
Robert D. Lee
Gary H. Littleton
Rhonda C. Littleton
Nikki R. Luton
William B. Luton
Carla N. Maine
Billie Jo Anne Malatesta
Heather A. Malone
Brenda D. Markham
Stacy D. Marriner
Elizabeth A. Martins
Grant E. Masson
Kendra C. McClees
Vivian J. McDaniels
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Carrie E. Miller
Gina R. Miller
Miriam N. Mojarro-Guintero
Helen W. Moore
Natalie D. Moore
Amy O. Morgan
Don M. Morring, Jr.
Darryl H. Napier
Madeline S. Nunley
Michael V. On
Devine D. Overton
Frances L. Overton
Crystal D. Owens
Inger L. Parker
Mary A. Parker
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Richard F. Petersen
Tierra M. Porter
Kristy M. Poyner
Sharon L. Priest
Joshua D. Quidley
Latonya M. Raynor
Donna M. Richards
Selma Riddick
Cleantha D. Samuel
Emma L. Sawyer
Sharonne T. Sawyer
Sarah E. Scaff
Jenny Marie Scott
Kristi Shank
Crystal D. Simpson
Olga H. Simpson
Belshelya D. Smith
Kacey L. Smith
Robert G. Snowden
Zenika S. Spence
Shontel M. Spruill
Risha E. Stallings
Kristin E. Suchy
Virginia A. Talmadge
Laysha N. Taylor
Tia N. Thorne
Ricki W. Tillett
Julia G. Todd
Melinda R. Vaughn
Kevin J. Wade
Kristie Walker
Kristopher K. Wallace
Ru-Hsuan S. Wang
Tanya R. Ward
Teresa B. Ward
Teresa L. Watkins
Cynthia S. Watts
Rena L. Wear
Joseph G. Webb
Dawn S. Weeks
Davina L. White
Della W. Wiggins
Kia M. Williams
Rukiya S. Williams
Joseph C. Wills
Jeffrey A. Wood
Craig L. Woodward
Lauren C. Woolard
Chaquella S. Worthington
Natasha D. Yancey
Elaine V. Yarborough

Vice-Chancellor's List: 3.50 to 3.74 Average

Kirby M. Alston
Branden G. Anderson
Chrystal L. Anderson
Jamica Ashley
Joseph Ausby, Jr.
Connie P. Balduf
Antonio D. Barrow
George W. Basnett, Jr.
Susanne D. Blevins
Larry A. Blunt
Asani D. Brewton
Rhonda J. Britton
Carmen A. Brown
Erica D. Burnell
Brandon L. Burris
Athena Chasteen
Angela R. Cohoon
Mark P. Copeland
Tina B. Craddock
Brian W. Damron
Dedrick M. Daniels
Christopher M. Davidson
Kindred D. Davis
Shantel N. Davis
Norma J. Devita
Dorothy O. Downing
Lauren M. Elfring
Philip J. English
Tamekia M. Evins
Marcos J. Fabio
Crystal L. Forbes
Willie J. Gilchrist
Demetra J. Gilmore
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Kendra C. Smith
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Quintina C. Speller
Lachelle W. Spence
Kathleen M. Stadler
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Tiothy C. Summers
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Rebecca R. Thompson
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Khima L. Toxey
Simone N. Uter
Quincina Uzzell
Jennifer F. Vanhorn
Shamelka T. Vick
Timothy J. Walter
Stephanie L. White
Latoyia S. White-Bailey
Chantee Wilkins
Penda R. Wilkins
Michaela R. Williams
Anita L. Ogoman
Ricky T. Wooten
Natasha L. Wynn
Melanie M. Young

Honor List: 3.00 to 3.49 Average

Reba F. Ackiss
Gregory E. Ackles, Jr.
Saidah K. Adkins
Hope A. Albritton
Enoch M. Alexander
Kristopher S. Alexander
April D. Allen
Catina R. Alston
Scottie L. Alston
Tanya M. Arellano-Chesson
Octabia T. Armond
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Adrienne L. Arrington
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Kimberly W. Bond
LaVar D. Bond
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Kipley E. Brown
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Erica L. Butts
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Tameka N. Cherry
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Damian A. Conyers
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McKeith L. Cordell
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Quentona F. Cothran
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Julius L. Council
Monique G. Cowell
Torreon N. Creekmore
Charlie W. Cuffee
Kerry-Ann L. Cummings
Barbara M. Davis
Patricia A. Davis
Shequita C. Davis
Sondrea L. Davis
Anissa Deltoro
Monisha L. Downing
Carla C. Eason
Alexander L. Edwards
Kimberly T. Edwards
Latoya S. Eley
Shaleka L. Eley
Vershawn L. Eley
Latisha J. Ferguson
Margie C. Ferrell
David L. Flanders
Elaine Fleetwood
Justin A. Ford
Tasha S. Ford
Latisha M. Freeman
Lotisha L. Freeman
Jennifer W. Fueston
Temekia Gilliam
Osvaldo E. Gonzalez
George K. Gordon
Wyconda D. Gray
Trina L. Gregory
Khaliah D. Griffin
Lina J. Griffin
Joshua B. Harrell
Paula R. Harrell
Sheena M. Harrell
Heather D. Harrington
Lauren E. Harris
Schquetta L. Hawkins
Tommie E. Hedgepeth, Jr.
Rahim M. Helms
Bonnie N. Higgins
Kimberly T. Hill
Mary L. Hill
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Kimberly R. Hockaday
karen J. Hoffman
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Yolanda T. Jordan
Valez M. Kendrick
Susan V. Kiyver
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LaQuanda P. Leary
Dwayne A. Leonard
Lindsay C. Lewis
Timothy M. Lewis
Kendrick A. Lynch
Melody Lynch
Lakeisha S. Mallory
Mark A. Martin
Roy P. Martin, IV
Autry B. Mattison
Melvin L. Mattocks
Danielle McCain
Amanda L. McDonald
Terri L. McKean
Marcus R. McPhatter
Maurice A. McPhatter
Lauren A. Meads
Clayton N. Mercer
Teri R. Mercer
Jennifer L. Midgett
Antonio N. Midgette
Kisha A. Mike
Jewel U. Milliken
Lakisha N. Mills
Jason A. Mitchell
Stephanie Y. Mitchell
Anthony M. Moore
Cynthia B. Moore
Kevin E. Moore
James Moye
Duron T. Myrick
Golar F. Newby
Latashia Newsome
Tamika S. Nixon
Taina M. Noriega
Latoya K. Outlaw
Paul M. Overmann
Allison M. Ownbey
Kimberly N. Parker
Shanyell M. Parker
Patricia A. Parks
Shannon E. Penn
Danny J. Person
Larissa G. Person
Daniel M. Phelps
William T. Phelps
Lauren M. Plontka
Tanyetta M. Pittman
Serena C. Price
Jennifer B. Pride
Amanda R. Ralph
Elizabeth T. Rascoe
Domaine D. Reels
Shandreka G. Reid
Shawneque L. Reid
Patty L. Rennert
Yvonne Ribeiro-Yemofio
Bobby S. Richardson
La'Toya N. Richardson
Hope M. Riddick
Montrayl D. Riddick
Ashby M. Roane
Benekia N. Robbins
Chanta' R. Robinson
Kendra Jo Roche
Chrishanda A. Rodgers
Katrevia R. Rodgers
Buffy S. Ruffin
Sharita M. Saunders
Portia Z. Sawyer
Tiara D. Sellers
Erick M. Sharpe
Tiffany K. Shearn
Justin D. Shore
Travis A. Shoulars
Sophia L. Sibert
Nicky M. Silver
Guernardo Simmons
Nekeshia G. Simmons
Elizabeth A. Simpson
Shica T. Simpson
Eunice D. Smith
Tyreka Smith
Sandra M. Sneed
Lori S. Speller
Mary L. Spivey
Antwain L. Spratley
Travis J. Spruill
Kimberly D. Stanley
Tracy L. Staton
DeTra L. Stith
Anna L. Sutton
Annie L. Sutton
Barbara B. Sutton
Kent C. Sutton, Jr.
Shameka S. Sutton
Michelle C. Swain
Latoyal S. Swindell
Anthony D. Taylor
Olivia G. Taylor
Patricia A. Taylor
Elaina R. Terry
Tenisha M. Tillery
Monica L. Tillett
Jeremy P. Todd
Tony D. Toliver
Bethany M. Tucker
Donald R. Turner, Jr.
John D. Twine
DeAsia M. Tyler
Kasandra L. Umphlett
Aaron M. Underdue
Tiffany Valentin
Lanny L. Vickrey
Deborah A. Vines
Andrew L. Vinson, Jr.
Monica J. Vrablic
Wendy M. Wallace
Darius D. Walston
Free L. Walston, Jr.
Holly H. Wang
Requita M. Washington
Emilio J. Waters
Jentry R. Webb
Sharonda M. Wells
Kendra D. Whidbee
Anicka F. White
Rachel E. White,
Dangela T. White-Davis
Sarah M. Whitehurst
Tabitha L. Wilkins
Wanda M. Wilkins
Aniesia Williams
Cylia D. Williams
Frederick L. Williams
Lakeisha L. Williams
Latonya A. Williams
Takia P. Winrow
Connie C. Winslow
Tonja Y. Winston
John M. Wise
Pierre J. Wood
Crystal N. Woodley
John P. Workman
Corese D. Wynn
Christopher C. Young
Randy L. Younger

Honors Fall Semester 2002-2003

Chancellor's List: 3.75 to 4.0 Average

Enoch M. Alexander
Helen C. Amos
Chrystal L. Anderson
Dixie B. Armstrong
Tammy L. Armstrong
Vicky I. Arrington
Jamica Ashley
Shannon D. Autry
Jason R. Baccus
Ramatoulie Bah
Joanelle J. Baptiste
Antonio D. Barrow
Amanda F. Beavers
Barbara J. Beck
Amy L. Benton
Ann B. Benton
Michael S. Benton
Cristy S. Binder
Sherri D. Blount
Benjamin D. Blystone
Roberta D. Branch
Mary A. Bray
Michele W. Brickhouse
Teresa B. Bridgers
Tara D. Brinkley
Nalyhani C. Broughton
Megan A. Bunch
LaraeShontee A. Butcher

Anna J. Cahoon
Robin L. Calloway
Ryan J. Caruso
Jennifer L. Clagg
Jameson G. Clark
Betty Cobb
Lacoyia O. Cobb
Jospeh D. Cochran
Angela R. Cohoon
D'Andra H. Compher
Ava B. Cooper
Darius Cooper
Ebony M. Copeland
Heather D. Copeland
Tina B. Craddock
Sharon S. Creef
Teri A. Doleski
Dashaun M. Dorsey
Shannon A. Doyle
Lisa C. Duke
Don S. Etheridge
Amber L. Everett
Marcella Ference
James W. Fox
Christi Froelich
Allison A. Galovic
Valerie C. Garland
Anthony N. Gilbird

Jamila C. Godfrey
Sharon L. Goehring
Danielle C. Graves
David L. Gray
Kimberly Green
Cindy E. Griffin
Javon Griffin
Shavonne L. Harcum
Carisa J. Harrell
Jerry W. Harrell
Katherine E. Harrell
Sheena M. Harrell
Krystal M. Harris
Shari J. Harris
Lindsey Hayes
Bonnie N. Higgins
Kimberly B. Hoggard
Leslie L. Holden
Lakesha Holley
Kerry A. Hughes
Stephanie Humphries
Jean L. Jackson
Amber D. Johnson
Cassandra J. Jones
brenda P. Jordan
Kendra L. Keith
Sharon E. King
Clayton Knight

Teresa H. Knight
Robert D. Lee
Damion O. Lewis
Betty P. Liles
Nikki R. Luton
Dreama A. Lyons
Katrina L. Macklin
Casey Maderazo
Marcia P. Majett
Billie Jo Anne Malatesta
Lakeisha S. Mallory
Heather A. Malone
Elizabeth A. Martins
Joy L. McGhee
Lauren A. Meads
Kenneth R. Mihalyov
Carrie E. Miller
Jason A. Mitchell
Jasheen D. Mizelle
Don M. Morring, Jr.
Darryl H. Napier
Tarhata N. Newby
Paul M. Overmann
Jonathan M. Owens
Mary A. Parker
Sharon W. Peavy
Michelle S. Pennington
Lori H. Perry

Tiffany M. Perry
Karen A. Petersen
Tierra M. Porter
Jennifer L. Prayer
Penelope A. Pugh
Joshua D. Quidley
Michelle A. Ragland
Amanda R. Ralph
Neils F. Ribeiro
Yvonne Ribeiro-Yemofio
Katrevia R. Rodgers
Demetrus M. Rorie
Angela F. Rountree
Cleantha D. Samuel
Jill M. Sarmie
Emma L. Sawyer
Joshua J. Sawyer
Sarah E. Scaff
Jenny M. Scott
Carl W. Seward
Eunice D. Smith
Sandra M. Sneed
Pamela A. Spruill
Lisa L. Spry
Kathleen M. Stadler
Tracy L. Staton
Louise A. Steiner
DeTra L. Stith

Timothy C. Summers
Elizabeth A. Sykora
Patricia A. Taylor
Susan R. Taylor
Terrunda T. Taylor
Keisha Y. Thomas
Tia N. Thorne
Donald Tinsley
Chukwuemeka Ugochukwu
Simone N. Uter
Kristen VanHorne
Jennifer F. Vanhorn
Melinda R. Vaughn
Deborah A. Walsh
Alberta N. Wandell
Kristen M. Waters
Rena L. Wear
Joseph G. Webb
Meleen D. Webb
Wendy E. White
Kenya L. Whittington
Doretha W. Woods
Craig L. Woodward
Lauren C. Woolard
Natash L. Wynn
Pauline A. Younger

Vice-Chancellor's List: 3.50 to 3.74 Average

Hope A. Albritton
LaToya R. Allen
Patrick A. Ball
Edgar T. Barrow
Hilda S. Barrow
Shanique L. Beale
Hilbert L. Beasley
Kimberly N. Bedgood
Teresa R. Blount
Candida L. Bond
Sheila M. Brady
Carmen A. Brown
Alton Bunch
Charita M. Burden
Erica D. Burnell
Charisma D. Canty
Latanya M. Carr
Carla S. Chambers
Alvita C. Clark
Tabitha O. Clemons

Mark P. Copeland
Brian W. Damron
Dedrick M. Daniels
Iliana T. Daniels
Crystal D. Davis
Paulique M. Duson
Carla C. Eason
Latoya S. Eley
Danielle A. Farris
Jessica E. Fields
Lisa J. Finch
Crystal L. Forbes
Justin A. Ford
Shawn J. Gary
Jeddiah U. Gist
Dawn S. Graham
Shkia J. Grant
John B. Griffith, Jr.
Takeyia N. Hall
Joshua B. Harrell

Schquetta L. Hawkins
Kristel L. Hedgepeth
Andrea M. Hill
James N. Hill
Lacey A. House
Calvin M. Hurdle
Shinika S. Johnson
Nina S. Jones
Tahquetta A. Jones
Monique S. Joyner
Valez M. Kendrick
Chimur S. Knight
Jerry T. Lane, Jr.
Erin E. Leary
Debra A. Luke
Ashley K. McCleary
Kendra C. McClees
Jeffifer L. Midgett
Nellie V. Mitchell
Audrey A. Moore
Kichelle N. Niles

Shanna A. Nixon
Allison M. Ownbey
Reggie L. Parker
Steven A. Parker
Philip W. Patrick
Renee D. Pendleton
Shalonda L. Poole
Jennifer M. Powers
Maureen C. Pulley
Robin L. Reese
Jennifer R. Reinholz
Cherie N. Richards
Marceller R. Riddick
Novella B. Riddick
Kendra Jo Roche
Suzette B. Rodgers
Ashlee F. Rose
Jennifer A. Rountree
Jamon Rouse
Shawnell D. Scott
Glovette O. Shannon

Alicia S. Simpson
Regina E. Simpson
Alisha M. Smith
Fatina M. Smith
Melissa M. Smith
Michael D. Stallings
Raymond S. Stallings
Quinnesha N. Staton
Rodney I. Stewart
Brandon M. Strausser
Kristin E. Suchy
Shameka S. Sutton
Michelle C. Swain
Virginia A. Talmadege
Raymond Tann
Toby G. Tate
Irene S. Teleky
Maceo J. Thomas
Marquita Thompson
John D. Twine
Kasandra L. Umphlett

Monica J. Vrablic
Kevin J. Wade
Michael L. Webb, II
Sharonda M. Wells
Rashonda D. Wester
Annette C. Whidbee
Rachel E. White
Sherron D. White
Angela T. White-Davis
Sarah M. Whitehurst
Kimberly Whitmire
Della W. Wiggins
Billy Williams, Jr.
Cylia D. Williams
Adreene L. Wilson
Nancy A. Wilson
Connie C. Winslow
Melanie M. Young

Honor List: 3.00 to 3.49 Average

Reba F. Ackiss
Kristopher S. Alexander
Kiana N. Allen
Latesha M. Allen
Catina R. Alston
Kirby M. Alston
Anthony M. Anderson
Justin E. Anderson
Lizette S. Armstrong
Edna M. Arnesen
Akilah Arrington
Terek R. Askew
Joseph Ausby, Jr.
Ann L. Baker
Ray E. Baker
Kelly L. Banks
Katia P. Barber
Mariel C. Barnes
Angela T. Barrington
George W. Basnett, Jr.
Ginjah A. Battiste
Lesley A. Bernhardt
Jennifer L. Blackwell
Susanne D. Blevins
Larry A. Blunt
LeVar D. Bond
Melanie L. Boone
Kina S. Bowe
Patrice M. Boyce
Asani D. Brewton
Tonya Brinkley
Joplin D. Brock
Shayla R. Brooks
Jeanette Brothers
Dana V. Brown
Kipley E. Brown
Randy Brown
Willie L. Brown
Amanda L. Bruce
Tamario D. Bryant
Alison El. Buck
Clinton D. Burdick
Brandon L. Burris
Erica L. Butts
Latoya D. Bynum
Leon A. Bynum, II
Eric M. Byrum
Grace V. Carter
Sharika Y. Carter
Shamika L. Cash
Kiana S. Chambiee
Natasha S. Cherry
Tameka N. Cherry

Mandy L. Clapp
Tory A. Clark
Kendra M. Cobb
Willie E. Cofield
Argyle J. Collins
Faleisha L. Cooper
Mark S. Cooper, II
Nicholas G. Cooper
Candace D. Cosgrove
Quentona F. Cothran
Julius L. Council
Linwood Creekmore
Kenneth A. Creighton
Kerry-Ann L. Cummings
Chelsey N. Daniels
Brookes Davis
Joseph W. Davis
Sondrea L. Davis
Angela E. Dean
Dorothy O. Downing
Monisha L. Downing
Nicolet A. Dozier
Alexander L. Edwards
Buffy T. Edwards
Stacey R. Edwards
Zaccheaus R. Eley
Shaneka A. Ellis
Darius D. Eure
Garre'Le'Kelth Evans
Edita M. Ewell
Devona M. Falson
Corey L. Faltz
Courtney D. Farmer
Leann K. Ferrell
Margie C. Ferrell
Marquita L. Figgs
Cili D. Finch
Johnnie L Finch, Jr.
Portia R. Fore
Susan M. Fortenberry
Anita W. Freeman
Lydra A. Freeman
Johnny M. Fuller, Jr.
Shelley D. Garriss
Jameson D. Gibbs
Temekia Gilliam
Demetra J. Gilmore
Gwendolyn F. Glasper
Amanda P. Godfrey
Tiffanie L. Goffigan
Gracie D. Goss
Stephanie A. Goss
Jonelle L. Graham

Jarvis K. Gray
Wyconda D. Gray
Susan E. Green
Makitta M. Gregory
Melvona J. Griffin
Sharon R. Griffin
Tina J. Griffin
Juanita D. Grimes
Tamika R. Groves
Patricia J. Halsey
Catherine M. Harrell
Paula R. Harrell
Danielle Harrigan
Javont'e J. Harris
Lauren E. Harris
Tiffany M. Harris
Lonnel R. Harrison
La-Shonda R. Harvey
Eric C. Heath
Tommie E. Hedgepeth, Jr.
Rahim M. Helms
Jerquitta C. Hicks
Tenifa C. Hicks
Heather R. Higgins
Tiffany S. Hill
Kimberly R. Hockaday
Kavona T. Holley
Tinitra J. Holley
Keisha M. Holloman
Shamecka N. Hopkins
Marlea P. Jackson
Jacklyn C. James
Teresa L. James
Tijan F. Jarra
Katrina E. Jeffers
George M. Jerman, Jr.
Latanya S. Johnson
Jennifer D. Jones
Jesse G. Jones
Linquenette S. Jones
Ulessia L. Jones
Wendy R. Jones
Bridget A. Jordan
Chanta T. Jordan
Wyatt R. Jordan, III
Yolanda T. Jordan
Sean M. Kaidahl
William E. Kearney
Brandye S. Kellogg
Tre'ona S. Kelly
Andreas R. Kersey
Stephanie R. Kudyba
Brook R. Lane

Alyssa C. Lanier
April W. layton
Aisha R. Lewis
Lindsay C. Lewis
Latisha L. Lofton
Marquita L. Lovick
Melody Lynch
Elizabeth D. Lyons
Kelly A. Mahaffey
Carla N. Maine
William M. Mansfield
Brenda D. Markham
Mark A. Martin
Jennifer Y. Mason
Autry B. Mattison
Kendell S. McClain
Kenneth P. McCoy
Shayla L. McDuffie
Marcus R. McPhatter
Maurice A. McPhatter
Nicolas T. Meadows
Michelle A. Melvin
Teri R. Mercer
Stephanie R. Miller
Davon M. Mitchell
Davona T. Mitchell
Amber C. Moore
Anthony M. Moore
Dexter R. Moore
Kevin E. Moore
Daniel J. Morey
Allison K. Moulden
Joy A. Myers
Jamie L. Nash
Nickesha M. Neal
Tina M. Noriega
Christopher X. Oliver
Veronica S. Ormond
Robert L. Overton
Nichole C. Paige
Catherine Z. Papoulogiou
Shanyell M. Parker
Toriano A. Parker
Marques D. Prks
Malshia Parrish
Shannon E. Penn
David G. Pernie
Lydia R. Perry
Larissa G. Person
Tanyetta M. Pittman
La'Varis Poole
Kristy M. Poyner
Cedric T. Pratt

Serena C. Price
Jennifer B. Pride
William G. Pritchard
William B. Privott
Candace Ransom
Krystal Ransom
Patty L. Rennert
Angel R. Richardson
April M. Richardson
Hope M. Riddick
Kandis K. Riddick
Kristie L. Riddick
Montrayl D. Riddick
Ashby M. Roane
Casey D. Roark
Chanta' R. Robinson
Kyle W. Rose
Sheronda M. Rountree
Kenneth M. Rucker
Buffy S. Ruffin
Cristina L. Sanchez
Tanya L. Sanford
Crystal M. Sawyer
Portia Z. Sawyer
Travis A. Shoulars
Janice L. Silver
Jennifer Silverwood
Sirena Simmons
Tiyon L. Simmons
Elizabeth A. Simpson
Marquita S. Simpson
Natasha M. Sledge
Jason C. Small
Jennifer S. Smith
Katrina A. Smith
Larry E. Smith
Mallory D. Smith
Natalie N. Smith
Tyreka SMith
Latoya L. Snead
Ivey S. Spears
Lachelle W. Spence
Shala T. Spence
Angel Spencer
Tinna Spencer-Alcantar
Antwain L. Spratley
Ashley J. Spruill
Kimberly D. Stanley
Kina M. Stanley
Sabra K. Stevenson
Qunedas E. Stokley
Thomas N. Stowe, Jr.
Melanie R. Stroman

Anna L. Sutton
Barbara B. Sutton
Tiffany E. Sutton
Marian R. Sykes
Anthony D. Taylor
Teyona L. Taylor
Londrea R. Thomas
Wendell O. Thomas
Quanesha Q. Thompson
Evelyn T. Thornton
Jeremy P. Todd
tony D. Toliver
Carleesha R. Tucker
Urica A. Twine
Shaina L. Tyler
Esther R. Upton
Quincina Uzzell
Nelson D. Veale
Valenta J. Wade
Sha'Tonna D. Walker
Darius D. Walston
Mona M. Walton
Ru-Hsuan S. Wang
Lisa N. Ward
Shameka N. Ward
Tanya R. Ward
Norma S. Wesson
Donald L. Whidbee
Brian A. White
Lavonda N. Whitt
Tabitha L. Wilkins
Wanda M. Wilkins
David G. Williams
Howard O. Williams, Jr.
Karitsa G. Williams
Lakeisha L. Williams
Nathaniel A. Williams
Rukiya S. Williams
Tia D. Williams
Joseph C. Wills
Brian L. Wilson
Takia P. Winrow
Shemeka N. Winston
John M. Wise
Richelle-M. Woodward
Fawn O. Workman
John P. Workman
Chaquella S. Worthington
Natasha D. Yancey

FOCUS

Page 1
Page 2

ECSU ONR Program

Georgia Tech Focus 2003

Office of Naval Research

On January 16-19, 2003, several students in their junior year at ECSU attended the FOCUS 2003 program held at Georgia Institute of Technology in Atlanta, Georgia.

FOCUS is designed to give prospective African American graduate students and faculty an opportunity to receive an overview of the academic programs at Georgia Tech and participate in the Dr. Martin L. King, Jr. celebrations. Focus 2003 also provided financial alternatives and assisted in the overall decision-making process for selecting a graduate school.

Some of the featured speakers were:

Calvin Mackie
Co-founder of Channel Zer0

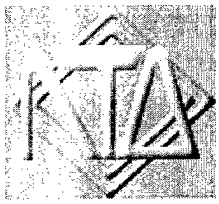
Dixie Garr, vice president,
Customer Success Engineering, Cisco Systems, Inc.

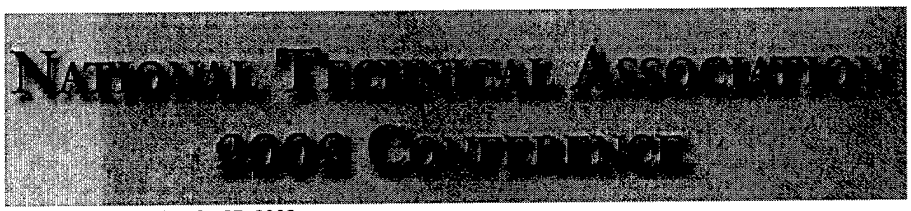
Marian Wright Edelman
Founder/Pres. of Children's Defense Fund (CDF)

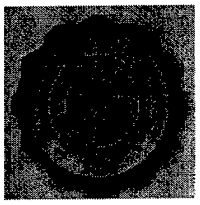
ECSU ONR Program

Georgia Tech Focus 2003

Office of Naval Research







September 24-27, 2002

Conference Luncheons

National Technical Association
ECSU ONR NERT
ECSU
Office of Naval Research

"'Planning and Program for the New Millineum - Technically and Educationally Focused' was the theme for of the conference which was attended by minorities from the engineering, science, architecture, and technology fields."

Quotes:

"Power tends to corrupt"

"A day on and a day off"

"The mind should be able to pass judgement in events"

"Education is power"

- Ramatoulie Bah
ONR Research Student

This years National Technical Association Conference was held in Las Vegas, NV at the Excalibur Hotel. Attending from Elizabeth City State University were Dr. Linda Hayden, Ramatoulie Bah, Shayla Brooks, Vincent Davis, and Carl Seward.

Some of the speakers were:

- "Blacks in Management" by Dr. Darryl Tukufu, President and CEO of the Tukufu Group Inc., and Director of The Urban League – Nashville, TN.
- "Title" by Dr. Woodrow Whitlow, Jr., Director, Research and Technology NASA Glenn Research Center, Cleveland, Ohio
- "The Cost of Success" by Dr. and Mrs. Dexter/Philomena Johnson

"The Undergraduate category had 3 winners, 1st place went to Carl Seward of Elizabeth City State University, 2nd place went to Meagan Wright of Clark Atlanta University, and 3rd place went to Vincent Davis of Elizabeth City State University. There were also several Honorable Mentions in the Undergraduate Category. "

-Shayla Brooks
ONR Research Student

2002-2003 Office of Naval Research Final Research Reports

April 8 & 10, 2003

On the 8th and 10th of April, 2002, Office of Naval Research students presented their final reports for the 2002-2003 research year. The areas of research this year included Globe, Multimedia, Remote Sensing, Networking and Unix.

Reports and research conducted for each team can be found at the links to the left.

Globe Research Team

Mentor: Mr. Ervin Howard

Team Members:
Dana Brown
Elizabeth Rascoe
Shawneque Reid
Carl Seward

Networking Research Team

Mentors: Mr. Chris Edwards, Mr. Kuchumbi Hayden

Team Members:
Danielle Graves
Paula Harrell
Golar Newby
Rodney Stewart

Multimedia Research Team

Mentor: Mr. Jeff Wood

Team Members:
Shayla Brooks
Willie Gilchrist, II
Nelson Veales

Remote Sensing Research Team

Mentors: Mrs. Sharon Brown, Ms. Keisha Harrison, Mr. Jonathan Williams

Team Members:
Karitsa Williams
Willie Brown, Jr.
Jovan Griffin
Jerry Johnson
Anthony Anderson

UNIX Research Team

Mentor:
Mr. Benjamin James

Team Members:
Demetrus Rorie
Eunice Smith
Vincent Davis
Torreon Creekmore
Linwood Creekmore
Ramatoulie Bah

Dr. William Mackey Visiting Lecture - Colloquium Series

African Dance and the Development of a Mathematics of Dance

Dr. William K. Mackey of Cheyney University and a NASA NAFP Fellow presented "African Dance and the Development of a Mathematics of Dance" on Thursday, November 21st in Lester Hall on the campus of ECSU. His lecture was sponsored by ECSU's Computational Science - Scientific Visualization Center and the School of Math, Science and Technology as part of the Visiting Lecture - Colloquium Series.

Dr. Mackey spoke of what brought him to the study of this subject and how he combined his love of dance with his love of math. His view of the intricate parts of dance and how we can tie them to mathematics was enlightening to all present.

ECSU
NIA
CSSV
Math, Sci, & Tech

Inclusion Innovation Investment

Fourth Expanding Opportunities Conference in Atmospheric and Oceanic Sciences

March 30- April 1, 2003 Florida A&M University Tallahassee, Florida

NOAA

Florida A&M University

Department of Commerce

ECSU

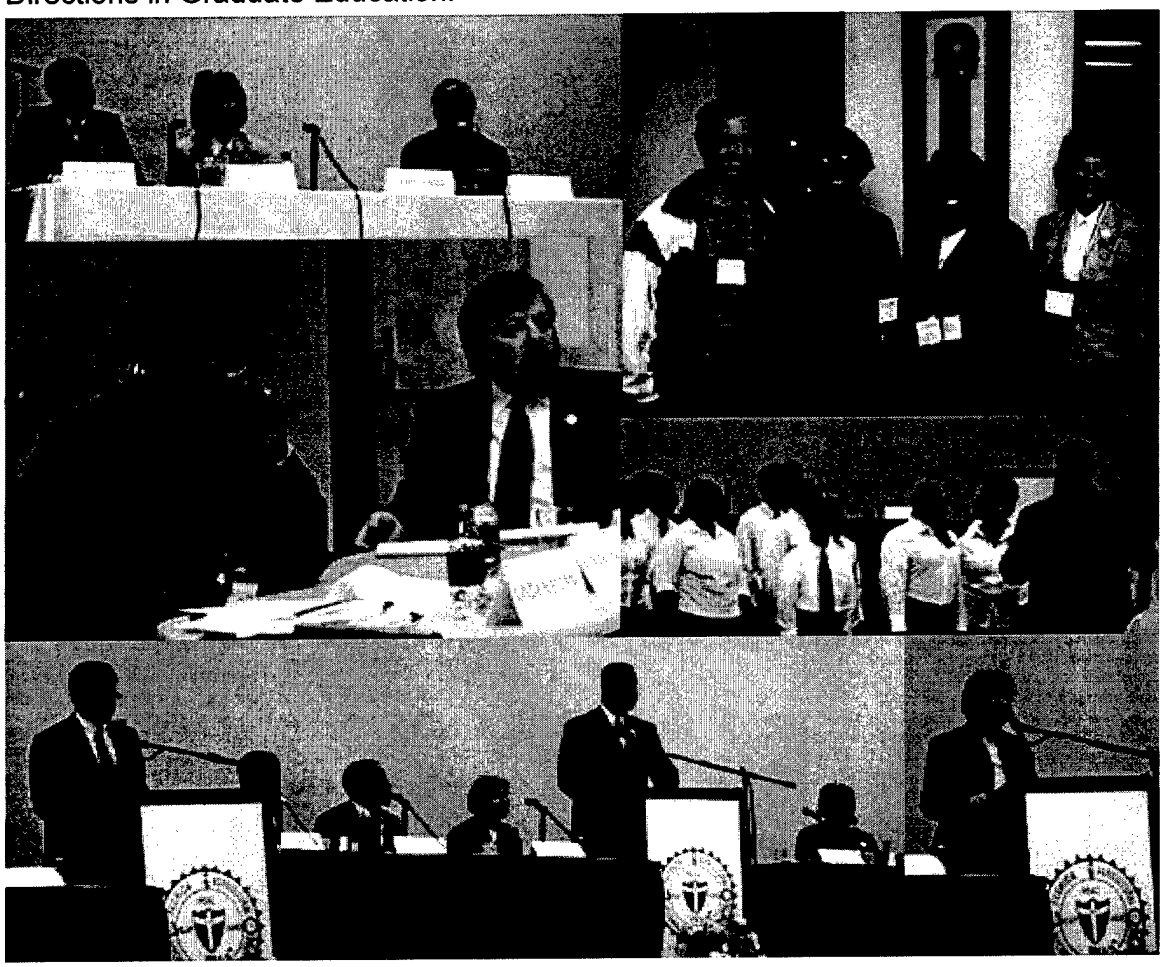
NIA

A conference to:

- Build institutional capacity
- Sustain partnerships between the public and private sectors
- Exchange scientific information

Conference Photos | Poster Session | Tallahassee Area

Representatives from Elizabeth City State attended the Fourth Expanding Opportunities Conference in Atmospheric and Ocean Sciences on March 30- April 1 at Florida A&M University in Tallahassee, Florida. This conference was sponsored by NOAA, the Department of Commerce and Florida A&M University. This conference has a goal of expanding academic training and employment opportunities for students who have an interest in science and who are attending minority serving institutions. The conference consisted of several panel sessions, poster sessions, oral presentations and speakers from various institutions. Dr. Linda Hayden, Principal Investigator for the CERSER research project, represented ECSU on the board for Expanding Opportunities II: New Directions in Graduate Education.



2003 Council on Undergraduate Research
Posters on the Hill

UNC ECSU CUR NIA

The mission of the Council on Undergraduate Research is to support and promote high-quality undergraduate student-faculty collaborative research and scholarship. The Council on Undergraduate Research (CUR) and its affiliated colleges, universities, and individuals share a focus on providing undergraduate research opportunities for faculty and students at predominantly undergraduate institutions.

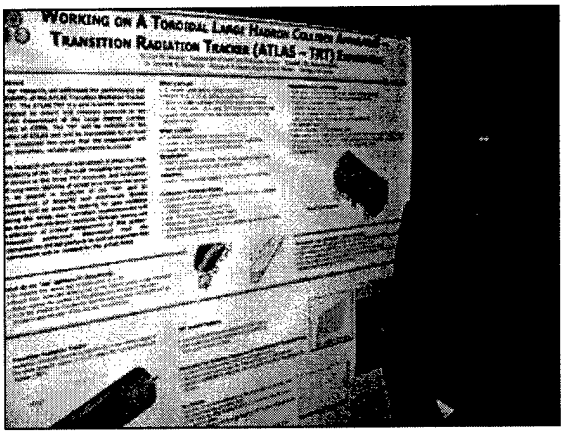
Several representatives from Elizabeth City State University made poster presentations during this years "Posters on the Hill" event at the capitol in Raleigh, North Carolina. They were accompanied by Dr. Mickey L. Burnim, Chancellor and Dr. Carolyn Mahoney, Vice Chancellor for Academic Affairs. Students representing ECSU were Carl Seward, Golar Newby, Danielle Graves, Nelson Veales, and Linwood Creekmore. More information regarding their presentations can be found at the 2002 Summer Internships page.

ECSU Students with UNC President, Molly Corbett Broad

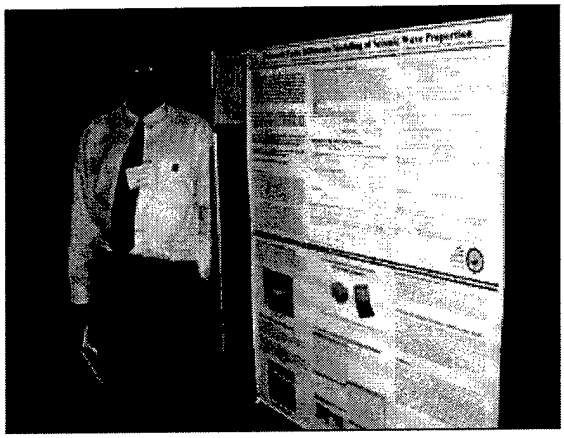
Student researcher Danielle Graves explains her research to Dr. Burnim

Dr. Mahoney and Dr. Burnim with student researcher Linwood Creekmore

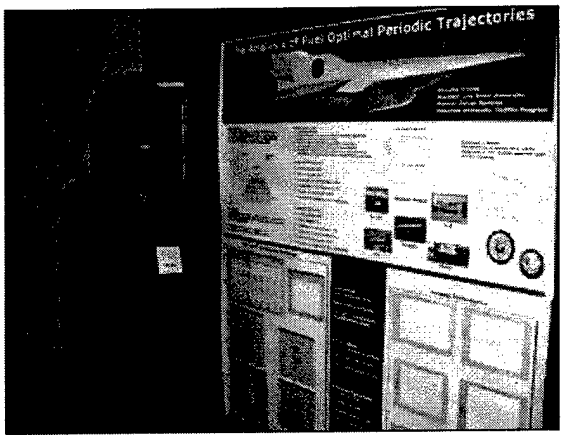
Dr. Burnim and Dr. Mahoney with student researcher Golar Newby



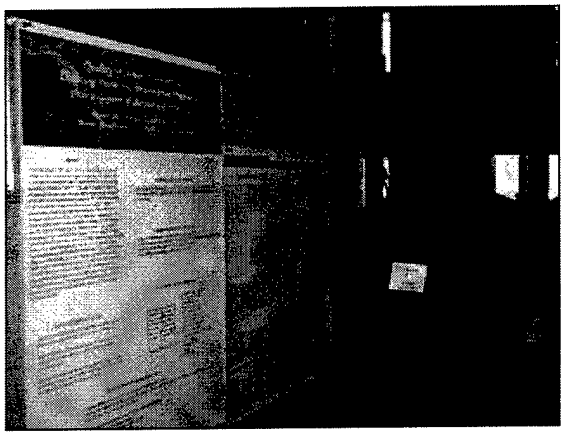
Student researcher Carl Seward
Research Title: Working on A Toroidal Large Hadron Collider Apparatus Transition Radiation Tracker (ATLAS TRT) Experiment
Poster in .jpg format



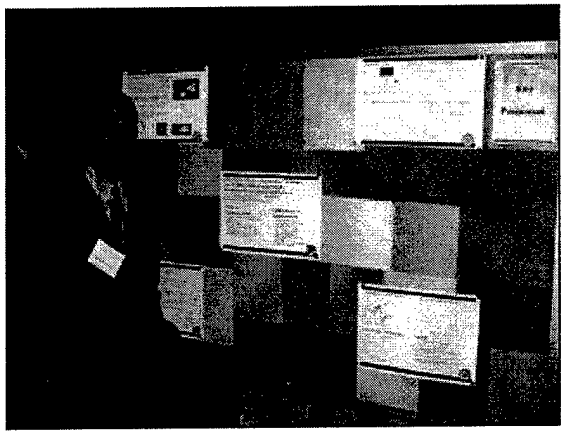
Student researcher Nelson Veales
Research Title: Forward Finite Difference Modeling of Seismic Wave Propagation
Poster in .jpg format



Student researcher Danielle Graves
Research Title:
The Analysis of Fuel Optimal Periodic Trajectories
Poster in .jpg format



Student researcher Golar Newby
Research Title:
Quality of Service Networking Utilizing Protective Preferential Treatment over a Gigabit Ethernet Environment



Student researcher Linwood Creekmore
Research Title: CdSe Semiconductor Nanomaterial Synthesis and Nonlinear Optical Spectroscopy for Optical Power Limiting Applications
Poster in .jpg format